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MONTEREY, CALIFORNIA

THESIS

IMPACT OF HOMELAND SECURITY COMMUNITIES OF LEARNING: DEVELOPING A STRATEGY FOR TRAINING AND COLLABORATION

by

Rick Braziel

September 2006

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13. ABSTRACT (maximum 200 words)

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This research investigates the potential impact of Homeland Security Communities of Learning on information sharing, training costs, and innovation. This study reviewed current efforts in Internet-based interactive learning through an analysis of Networked Based Learning. A futures forecast was conducted identifying trends and events that may influence the future of Communities of Learning.

The research findings support the creation of Homeland Security Communities of Learning that are designed to include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. A strong correlation (r=.798) was attributed to the degree to which Networked Based Learning contributed to knowledge accumulation.

The study presents a strategic plan, implementation framework, and Community of Learning pilot. The pilot includes previously excluded participants from non-Emergency Responder public and private stakeholders. Additionally the pilot identifies a significant cost savings with Communities of Learning.

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IMPACT OF HOMELAND SECURITY COMMUNITIES OF LEARNING: DEVELOPING A STRATEGY FOR TRAINING AND COLLABORATION

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Submitted in partial fulfillment of the
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This research investigates the potential impact of Homeland Security Communities of Learning on information sharing, training costs, and innovation. This study reviewed current efforts in Internet-based interactive learning through an analysis of Networked Based Learning. A futures forecast was conducted identifying trends and events that may influence the future of Communities of Learning.

The research findings support the creation of Homeland Security Communities of Learning that are designed to include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. A strong correlation ($r = .798$) was attributed to the degree to which Networked Based Learning contributed to knowledge accumulation.

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LIST OF ABBREVIATIONS

CCIC   Central California Intelligence Center

CDP   Center for Domestic Preparedness

CHDS   Center for Homeland Defense and Security

COMPSTAT   Computer Statistics (for NYPD weekly crime strategy meeting)

DHS   U.S. Department of Homeland Security

FEMA   Federal Emergency Management Agency

G&T   Department of Homeland Security, Office of Grants and Training

ILO   Infrastructure Liaison Officer

ISD   Instructional System Design

LCMS   Learning Content Management Systems

LMS   Learning Management Systems

LSU   Louisiana State University

MIPT   Memorial Institute for the Prevention of Terrorism

NBL   Network Based Learning

NCPSTC   Northern California Public Safety Training College

NGT   Nominal Group Technique

NPS   Naval Postgraduate School

NTS   U.S. Department of Energy, Nevada Test Site

OHS   California Office of Homeland Security

RTTAC   Regional Terrorism Threat Assessment Center - California

SPD   Sacramento Police Department

SPSS   Statistical Package for the Social Sciences

SROHS   Sacramento Regional Office of Homeland Security

SSD   Sacramento Sheriff's Department

STTAC   State Terrorism Threat Assessment Center California

TEW   Terrorism Early Warning

TLO   Terrorism Liaison Officer

TRC   Terrorism Research Center

WMD   Weapons of Mass Destruction

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I.   INTRODUCTION

A.   PROBLEM STATEMENT

As the threat of domestic terrorism increases and the demands on Emergency Responders and the public intensify, a more distributed, efficient, and flexible training and collaboration model is needed to guide future efforts.[1] Present efforts are falling short as the numbers of responders requiring training far exceed the capacity of training providers. Training providers are attempting to mitigate the overwhelming demand with static online courses.[2] Unfortunately, these online training efforts reduce or eliminate important collaboration opportunities necessary for continued education and problem solving. Moreover, very few Homeland Security training curricula consider the need for post-training collaboration and information sharing. Also missing from the majority of training plans is the inclusion of non-Emergency Responder public and private stakeholders.

B.   CURRENT EFFORTS

The U.S. Department of Homeland Security, Office of Grants and Training (G&T), in an effort to become more efficient and effective in training Emergency Responders, has adopted a "Blended Learning Approach" to training. Blended learning as defined by G&T includes training provided through a variety of mediums including traditional classroom, web-based, computer based, and video teletraining. The goal of G&T is to increase the numbers trained while containing costs. Unfortunately, the current blended learning philosophy of G&T unintentionally limits collaboration. As learners move away from interactive learning to more static based learning, such as online courses offered by FEMA and Texas A&M, continuing education and

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[1] Homeland Security Office for Domestic Preparedness, *Blended Learning Approach,* http://www.ojp.usdoj.gov/odp/training_bl.htm (accessed November 12, 2005).

[2] Phillip Allum, interview by author, telephone, Gold River, Ca., July 3, 2006.

collaboration is severely limited.[3] While helpful to increase participation, the online courses are asynchronous with no interaction with an instructor and no ability to identify and communicate with other participants. Homeland Security training should not be limited to technical instruction but provide opportunities for collaboration especially in an area where collaboration amongst responders is so necessary.

The significance of the of the problem is illustrated in the Center for Domestic Preparedness' (CDP) estimated need to train 11 million Emergency Responders in the area of weapons of mass destruction (WMD).[4] As one of five members of the National Domestic Preparedness Consortium, CDP offers fully funded resident and non-resident training. Eligible students must be Emergency Responders defined as emergency managers, pubic safety communications personnel, law enforcement, fire, emergency medical services, public works, government administration, hazardous materials personnel, health care, and public health.[5]

A further indicator of the need for training is that the 11 million Emergency Responders identified by CDP is only a snapshot in time and does not take into consideration new employees entering the workforce within the Emergency Responder disciplines. The identified unmet training need in the area of WMD does not include some of the specialized training courses offered by the four remaining consortium members. The New Mexico Institute of Mining and Technology offers live explosives training including the use of field exercises and classroom instruction, and the Incident Response to Terrorist Bombing course. Louisiana State University Academy of Counter-Terrorist Education (LSU) provides training to law enforcement agencies and focuses its efforts on the delivery of the Emergency Response to Terrorism. LSU offers two courses

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[3] FEMA National Emergency Training Center Virtual Campus, http://training.fema.gov/VCNew/firstVC.asp (accessed January 14, 2006); Texas A&M Domestic Preparedness Campus, http://www.teexwmdcampus.com/ (accessed January 14, 2006).

[4] Office for Domestic Preparedness Center for Domestic Preparedness, 2, http://www.ojp.usdoj.gov/odp/docs/CDP072005.pdf (accessed November 12, 2005).

[5] Homeland Security Office for Domestic Preparedness, *ODP WMD Training Program: Enhancing State and Local Capabilities to Respond to Incidents of Terrorism*, (Washington, D.C.: U.S. Department of Homeland Security, n.d.), xxi–xxii.

of instruction, Emergency Response to Biological Incidents and the Law Enforcement Response to WMD Incidents. The U.S. Department of Energy's Nevada Test Site (NTS) conducts large-scale field exercises using a wide range of live agent stimulants as well as explosives. NTS develops and delivers a Radiological/Nuclear Agents Course. NTS, in coordination with G&T, is establishing the Center for Exercise Excellence. The NTS Center will train agencies in the planning and conducting of exercises, tailored to the unique threats faced by participating jurisdictions.[6]

The Office of Grants and Training exclusion of non-Emergency Responders fails to acknowledge the tremendous role the private sector plays in Homeland Security. An important private sector area of Homeland Security training that goes beyond Emergency Responders is intelligence gathering and sharing. Information collection and intelligence distribution present unique challenges as identified in the U.S. Department of Homeland Security Fusion Center Guidelines.[7] Two critical aspects of the guidelines focus on the problem of training and collaboration.

While the focus of this research is Communities of Learning, the demanding requirements established in the Fusion Center Guidelines create an opportunity for evaluation and testing of systems necessary to implement Communities of Learning. Training and collaboration become critical as information collection and sharing expands. Complicating the process is the need for twenty-four hour a day information exchange across all sectors, public and private, throughout the United States. Any system developed must provide a multi-tiered awareness and education program to implement intelligence-led policing while developing capacity for information sharing.[8]

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[6] Center for Domestic Preparedness Homeland Security Consortium, http://cdp.dhs.gov/consortium.html (accessed November 12, 2005).

[7] Bureau of Justice Assistance, *Fusion Center Guidelines: Developing and Sharing Information and Intelligence in a New World*, Version 1.0 (Washington, D.C.: Bureau of Justice Assistance, 2005), 9.

[8] Ibid., 67.

C. LITERATURE REVIEW

1. Information and Intelligence Sharing

The ability to collect, analyze, and share information and intelligence with Emergency Responders and the private sector has significantly changed since September 11, 2001. Threats of terrorist attacks in the United States have created an environment in which Emergency Responders are forced to assess their ability to gather, analyze, and respond to terrorist threat information. In response, the U.S. Department of Justice and the U.S. Department of Homeland Security collaborated in the development of *Fusion Center Guidelines* (Version 1.0 July 25, 2005),[9] the intent of which is to provide comprehensive guidelines for developing a fusion center within a state or region. The first phase of the three phase guidelines focus on law enforcement intelligence. The next two steps will be to establish guidelines for public safety and the private sector.

Critical to fusion center success is the ability to facilitate the flow of information between the center, Emergency Responders, and the private sector. The ability to interact and share information requires collaborative technology as well as comprehensive and consistent on-going training. Unfortunately, the number of facilities and trainers necessary to complete critical training components is lacking. Additionally, collaborative technology is not consistent, and is either inadequate or under-utilized. Limited funding dedicated to Homeland Security training complicates the problem. A comprehensive method of training large numbers of Emergency Responders and the private sector in an efficient and cost effective manner must be established. The method designed must also facilitate collaboration.

In response to the intelligence void, California created the State Terrorism Threat Assessment Center (STTAC) and four supporting Regional Terrorism Threat Assessment Centers (RTTAC) that are aligned with the four California FBI Field Offices. As the RTTAC responsible for the Eastern District of California, it is critical that the Sacramento Regional Office of Homeland Security (SROHS) review the 17 guidelines

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[9] Bureau of Justice Assistance, *Fusion Center Guidelines*, i.

with a vision toward incorporating the training and collaboration requirements that are likely to be included in the remaining two phases.

The SROHS has entered into a Memorandum of Understanding (MOU) Constituting a Multi-Agency Intelligence Initiative with the U.S. Attorney's Office for the Eastern District and the Sacramento Division of the FBI creating the Central California Intelligence Center (CCIC). The CCIC will serve as a regional intelligence fusion center. Goals identified in the MOU include communication with users, creating a Terrorism Liaison Officer (TLO) program, and coordination and collaboration. The MOU is consistent with the *Fusion Center Guidelines*, and suffers from the same identified information sharing, collaboration, training, technology, and funding problems.

The SROHS has an established Terrorism Early Warning (TEW) Group modeled after Los Angeles, which includes representatives from state and local law enforcement, fire, and health. Included in the Los Angeles TEW model are Terrorism Liaison Officers (TLO) and Infrastructure Liaison Officers (ILO). Currently, additional TEW's exist or are in development throughout the United States and include San Bernardino/Riverside, Orange, San Diego, and Sacramento Counties in California; Pierce County, Washington; Tulsa, Oklahoma; and Hennepin County, Minnesota. The Oklahoma City Memorial Institute for the Prevention of Terrorism (MIPT), in partnership with G&T is sponsoring a series of TEW Workshops to stimulate the development of a network of TEWs nationally. The Terrorism Research Center (TRC) is the contractor for delivery of TEW workshops.

To expedite the flow of information, Terrorism Liaison Officers (TLO) are the primary point of contact for all terrorism-related information for their respective agencies and are selected from law enforcement, fire, public health, and public works personnel. The TLO creates a pathway for information flow and coordination among participating agencies. Infrastructure Liaison Officers (ILO) are drawn from the public and private sectors, primarily in critical infrastructure areas such as public utilities, rail, banking/finance, transportation, medical, and energy, and serve as a conduit for the flow of information between industries and the RTTAC.

The expansion of TEW across the U.S. is a potential solution to the need for information sharing and intelligence dissemination for regional partners. The problem is there is no standard for training or sharing of information outside of individual regional partnerships. The ultimate goal of the TEW system is that the entire national community of Emergency Responders shares information, which will require technology beyond what the current TEW system utilizes.

The Fusion Center Guidelines identify the need for fusion centers to act as an analytical hub, processing, evaluating, and disseminating critical information for law enforcement, public safety, and the private sector. Within the report, Guideline 13 is to "provide a multi-tiered awareness and educational program to implement intelligence-led policing and the development and sharing of information."[10] Without information provided by law enforcement, public safety, and the private sector, and a structure for intelligence to flow back out to the same entities, the fusion center will fail to accomplish the most fundamental mission of information and intelligence sharing.

2. Internet Based Interactive Learning

Internet based interactive learning is a potential solution. Distance learning technology has had an overwhelming effect on the way agencies conduct business. In reviewing the history of Internet-based learning, Shelly R. Robbins describes the four stages of distance learning development.[11] Stage-one is the generic content library with authoring tools delivering CD-ROM training. The Internet-expanded stage-one use of self-directed study courses eliminated the need for CD's and manuals. Content libraries gave way in stage two to learning management systems (LMS) with companies linking organizational goals to employee performance. Courses became available to meet identified needs with LMS by also supporting registration and tracking. Stage-three arose from the need to outsource e-learning. Many companies were unable to create and deploy proprietary e-learning courses using in-house staff. Stage four according to

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[10] Bureau of Justice Assistance, *Fusion Center Guidelines*, 67.

[11] Shelley R. Robbins, "The Evolution of the Learning Content Management System," *Learning Circuits* (April 2002), http://www.learningcircuits.org/2002/apr2002/robbins.html (accessed September 10, 2005).

Robbins is learning content management systems (LCMS). LCMS's are corporate versions of systems developed for higher education. LCMS allow subject matter experts, with little technology skills to develop curriculum, deliver courses, and monitor e-learning.

Distance learning is increasingly based on information technology that includes teleconferencing, satellite or cable signals, or interactive multimedia, including the Internet. Distance learning also includes e-learning where instruction is delivered through digital technology including private networks. Within the distance learning environment, instructor and student interact either in real time, or the student controls the pace, location, and contact. Real time interaction between instructor and student requires synchronous technologies. Asynchronous technology is adequate when the student controls the time and pace of instruction.[12] The two technologies are described separately but may be blended with each other or with other technologies to enhance the learning process.

Distance learning is a method for developing skills without the costs associated with traditional methods of face-to-face interaction between instructor and student. Additionally e-learning adds a dimension that when viewed in isolation is not readily apparent. The learning can be expanded into an environment such that knowledge development and sustainment become key components. Following traditional instruction, students disband when the course concludes. Without a structure to share future experiences, lessons learned are eventually lost. The trend in Homeland Security toward more efficient static training does not encourage post-training collaboration and knowledge sharing. Students are reliant on what was true at the time of training. There is little recognition of the need to adapt to accommodate new data, new inventions, new technology, and new problems.[13]

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[12] Kenneth C. Laudon and Jane P. Laudon, *Essentials of Management Information Systems: Managing the Digital Firm*, 5th ed. (Upper Saddle River, New Jersey: Pearson Education, 2005), 285.

[13] Joseph L. Badarracco, *The Knowledge Link: How Firms Compete through Strategic Alliances* (Boston: Harvard Business School Press, 1991), 24–25.

Several academic institutions and FEMA have developed e-learning instruction for Homeland Security. While helpful, the distance learning models currently in use are asynchronous with limited or no interaction with an instructor. Most of these systems lack the ability to identify and communicate with others participating in the same or similar instructional modules. The Center for Homeland Defense and Security (CHDS) is a notable exception to this model. The CHDS Networked Based Learning (NBL) curriculum design encourages students to collaborate in a community of practice.

3.   Community of Practice

Distance learning technology allows for the creation of a social structure that develops knowledge and the sharing of ideas and information. The social structure that takes responsibility for fostering learning, developing competencies, and managing knowledge is called a Community of Practice.[14] "Communities of Practice are groups of people who share a concern, a set of problems, or passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis."[15] Members communicate with each other through a complicated web of "personal networks," smaller, frequently overlapping groups comprise people who know, have worked with, and trust each other.[16]

These communities exist not out of mandates but an opportunity for people to share content and develop relationships.[17] These communities are formed through technology that allows members to share information across great distances. The

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[14] Bette Gray, "Informal Learning in an Online Community of Practice," *Journal of Distance Education* 19 (Spring 2004): 21–22; Etienne Wenger, Richard McDermott, and William M. Snyder, *Cultivating Communities of Practice: A Guide to Managing Knowledge* (Boston: Harvard Business School Publishing, 2002), 13.

[15] Wenger, McDermott, and Snyder, *Cultivating Communities of Practice,* 4.

[16] Kathleen Allen, Richard Bergin, and Kenneth Pickar, "Exploring Trust, Group Satisfaction, and Performance in Geographically Dispersed and co-located University Technology Commercialization Teams," (in proceedings of the NCIIA 8th Annual Meeting: Education that Works, March 18–20, 2004), 201; Julian E. Orr, *Talking about Machines: An Ethnograph of a Modern Job* (Ithaca, New York: ILR Press, 1996), 68–69.

[17] Etienne C. Wegner and William M Snyder, "Communities of Practice," *Harvard Business Review* 78 (Jan/Feb 2000): 139.

meeting place is not a traditional face-to-face interpersonal interaction but one facilitated by technology. In addition to identifying subject matter experts to assist in answering questions, communities of practice enable new members to quickly learn the technical and cultural aspects of their new roles and responsibilities.[18]

4.   Conclusion

With about 85 percent of critical infrastructure controlled by private organizations, the exchange of information and intelligence between fusion centers, Emergency Responders, and the private sector is critical to preventing acts of terrorism and crime. Both the TLO and ILO programs are designed to be a conduit for information exchange. A formalized process creating a partnership between the fusion center, ILO, and TLO has many benefits including improving public safety, response to terrorist acts, accidents, and natural disasters.

Information and intelligence sharing is important if the partners, including the private sector, are to have faith in the SROHS and the RTTAC. Training must be provided for TLO and ILO personnel through distributed methods to reduce or eliminate negative effects on the sponsoring agency or business. Ove Jobring in "Online Learning Communities," identifies three benefits associated with the sharing of information that are critical to e-learning success:

> 1. The ability to work with others from different cultures to discuss and implement new ideas;
>
> 2. Emphasis on integrated creative problem solving capacity;
>
> 3. The ability to solve complex problems requiring integration of social, economic, environmental, legal, and technical factors. [19]

In addition to training, a community of practice encourages active participation by all members. This interaction increases participant knowledge and expertise by

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[18] Gray, "Informal Learning," 21–22; E.L. Lesser and J. Storck, "Communities of Practice and Organizational Performance," *IBM Systems Journal* 40 (2001): 836.

[19] Ove Jobring, "Online Learning Communities: A Challenge for Communication and Learning Companies," 2, http://www.learnloop.org/olc/lobringolclima.pdf (accessed September 10, 2005).

interacting on an ongoing basis.[20]   This use of technology to share and exchange information is consistent with the expectations identified in the Fusion Center Guidelines developed by the Office of Homeland Security. Therefore, it is essential that the design of Communities of Learning achieve stakeholder alignment, allow for local variations within the Fusion Center Guidelines, and create opportunities for the members to interact.[21]

D.   RESEARCH QUESTION

What is the impact of Homeland Security Communities of Learning on information sharing, training costs, and innovation? As described by G&T, training including Communities of Learning must be agile enough to address dynamic requirements quickly, and robust enough to reach large, diverse, and growing audiences.[22] Additionally if Homeland Security is going to be effective Communities of Learning must include non-Emergency Responder public and private stakeholders.

For the purpose of this research, a Homeland Security Community of Learning is a shared place on the Internet that addresses Homeland Security learning needs through shared networks and technology that allow members from multidisciplines to work as a community to learn, share information, problem solve, and create innovations.

E.   RESEARCH OBJECTIVES

This research will investigate the development of Communities of Learning, designed to include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. A conceptual model will be proposed that will address collaboration and continuing education shortfalls identified in static training methods.

An e-learning strategy combined with an online community of practice will be the technology model used to create a Community of Learning. The conceptual model design will identify technology requirements, curriculum development, administration,

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[20] Wegner, McDermott, and Snyder, *Cultivating Communities of Practice,* 4.

[21] Bureau of Justice Assistance, *Fusion Center Guidelines*, 95–102.

[22] Homeland Security Office for Domestic Preparedness, *Blended Learning Approach.*

and support. To limit the scope of this research the model will serve as the framework for Terrorism Early Warning (TEW) participant training.

The model, while limited to Terrorism Liaison Officer (TLO) and Infrastructure Liaison Officers (ILO) Communities of Learning, should help to demonstrate the broader ability to create Communities of Learning at a significantly reduced cost per participant while enhancing capabilities and innovation. The model will also demonstrate the ease and cost effectiveness of including private sector and government employees how are currently excluded from Homeland Security training.

F.   METHODOLOGY

The methodological approach for this research is designed to assess the potential creating Homeland Security Communities of Learning by combining e-learning with communities of practice. The assessment leads to a strategic framework for a proposed Homeland Security Community of Learning pilot. The research is divided into six sections.

1.   Review of Relevant Literature

A review and analysis of e-learning and communities of practice was completed. The focus was to look at the development and application of both areas independently and shared. The review focused in areas and opportunities likely to create potential of combining the two concepts to construct Homeland Security Communities of Learning.

2.   Networked Based Learning Evaluation Review

The Center for Homeland Defense and Security (CHDS) facilitates a Networked Based Learning environment. CHDS asks all participants to complete an evaluation at the conclusion of each quarter of instruction. The evaluation focuses on areas of instruction including Networked Based learning, online resources, online participation, and course website facilitation. A review of evaluation results was conducted in relationship to online use and interaction.

3.   Expert Panel Discussion

For this thesis, Nominal Group Technique (NGT) was used to develop and identify trends, issues, and events related to the development of Homeland Security Communities of Learning. The goal was to identify potential trends and future events

that may affect the development and use of Homeland Security Communities of Learning. The NGT panel represented a diverse group of nine professionals with experience in private business, education, law, law enforcement, fire, and local and state government.

The research includes a futures study of Homeland Security Communities of Learning. Its purpose is not to predict the future, but rather to project a number of possible scenarios for strategic planning consideration. Defining the future differs from analyzing the past because the future has not yet happened. In this research, useful alternatives have been formulated systematically so that the strategic plan can include a range of possible future environments.

4. Subject Matter Expert Interview

A subject matter expert in Homeland Security training was interviewed about his experiences and potential opportunities. Areas discussed had a direct relationship to Homeland Security training, e-learning, and communities of practice including student participation, numbers trained, methods of training delivery, training delivery costs, and post-training collaboration.

5. Strategic Plan

The strategic plan, for this research project, defined strategies that will develop, implement, and manage efforts to create Homeland Security Communities of Learning. There was an emphasis to include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. The plan was constructed from information received in the literature review, NBL assessment, interview, and expert panel discussion.

6. Implementation Plan

An implementation framework is proposed that addresses collaboration and continuing education shortfalls identified in static training methods. An e-learning strategy combined with an online community of practice will be the model used to facilitate both training and collaboration. The framework identifies technology

requirements, curriculum development, administration, and support. The model will serve as concept development for use in Terrorism Early Warning (TEW) participant training.

The implementation plan, while limited to Terrorism Liaison Officer and Infrastructure Liaison Officer Communities of Learning, demonstrates the broader ability to create Communities of Learning at a significantly reduced cost per participant while enhancing capabilities and innovation. The plan also illustrates the ease and cost effectiveness of including non-emergency response personnel in Homeland Security training.

G. SIGNIFICANCE OF RESEARCH

There is no research that links Communities of Learning with enhanced Homeland Security capabilities, collaboration, and innovation. This thesis proposes an implementation plan for the creation of a Homeland Security Community of Learning that allows for enhanced learning, information exchange, and innovation at a reduced cost. As Federal guidelines standardize training and response, not only across disciplines but also across regions of the country, Homeland Security Communities of Learning have potential to enhance delivery and collaboration.

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II. NETWORKED BASED LEARNING ASSESSMENT

This chapter explores the Center for Homeland Defense and Security, located at the Naval Postgraduate School. The Center's educational program is similar to the Community of Learning model under study. A significant component of the center involves the use of e-learning technologies combined with a limited community of practice. These two characteristics combined with the emphasis on Homeland Security education make CHDS worthy of study for this research.

A. CENTER FOR HOMELAND DEFENSE AND SECURITY

The Naval Postgraduate School's Center for Homeland Defense and Security has been providing a Homeland Security master's degree program since 2003. The program is a collaboration between the Naval Postgraduate School (NPS) and the U.S. Department of Homeland Security (DHS) designed to deliver a graduate education to leaders from across a wide spectrum of disciplines in local, state, federal government, and the military. During the 18-month graduate program, CHDS requires students to be in residence two weeks every quarter. Students complete the remainder of their coursework through Networked Based Learning.[23]

Networked Based Learning uses the Internet as an interactive learning and collaboration tool by connecting instructors and students who provide information and ideas to support each other's learning. The similarities between NBL at CHDS and Communities of Learning provide an opportunity for analysis of evaluations completed at CHDS. In addition to measuring the success of NBL, the analysis has potential to influence the development of a Homeland Security Community of Learning strategic plan, implementation framework, and pilot.

During the 18-month curriculum, graduate students are required to complete thirteen courses. At the conclusion of each course, students complete an evaluation designed to measure the success of the course. The evaluation consists of several areas

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[23] Naval Postgraduate School, Center for Homeland Defense and Security, https://www.chds.us/?masters/overview (accessed July 16, 2006).

designed to measure increased knowledge of the subject instructed and the degree to which certain elements contributed to the education and instruction. Increased knowledge is evaluated by measuring course-learning objectives. The first scale is an estimate of knowledge prior to taking the course. The second scale is an estimate of knowledge after completing the course. The third is the level of importance of the objective to the discipline of Homeland Security. Each is measured using a nine point scale ranging from 1 = low to 9 = high.

Course elements that contribute to the student's ability to achieve learning outcomes are measured on a seven point scale with 1 = "no contribution at all" to 7 = "greatly contributed." Course elements measured in this manner are illustrated in Figure 1. Course evaluations also included open-ended questions measuring "what worked well" and "what could be improved" in both the instructional and Networked Based Learning portions. Self-reporting of average weekly hours spent online for each course is also collected.

Figure 1.   General Course Elements

The organization (structure, not content) of the website design for the course.
The content (information and materials) provided on the course website.
Online discussions with others in the class.
Individual Conference Rooms on the website.
Additional resources and links provided on the course website.
Rate the degree to which the Distance Learning contributed to your success (knowledge accumulation) in this course.

Course activity levels are measured on a seven point scale with 1 = "strongly disagree" and 7 = "strongly agree." The majority of course activities measured relate to participation in Networked Based Learning and are of particular interest to this research (Figure 2).

Figure 2.   Course Activities

I regularly posted to the online discussions.

I regularly received online comments and assistance from instructor(s).

I regularly replied to instructor's comments or replies to my post.

I regularly read what my fellow classmates post in the discussion sessions.

Being part of an online "learning community" is an important aspect of my nonresident learning experience in this course.

The design of the website contributed to my participation in this Networked Based Learning Environment.

Access to the instructors was good.

The timeliness of the instructors' responses to questions or comments was good.

The quality of feedback from the instructors was good.

General course elements (Figure 1) and course activities (Figure 2) were reviewed to identify criterion and predictor variables. While individual variable characteristics and the possible relationships between variables are of interest, the criterion variable is useful in determining the extent to which creating Communities of Learning affect Homeland Security learning and collaboration. The criterion variable used in this research is the variable "rate the degree to which the distance learning contributed to your success." The remaining variables serve as predictor variables in the sense that they may have variance in common with the criterion variable and information about them may possibly be used to predict outcomes of the criterion variable.[24]

B.   DESCRIPTIVE VARIABLE ANALYSIS

Statistical analysis was conducted on post-course surveys for nine courses completed by CHDS Cohorts 0501 & 0502 with the variables listed in descending mean order (Table 1). There is a noticeable disparity in the number (N) of survey responses. Two variables had a total 27 responses each while one variable had a high of 229 responses. A review of the data revealed that not all variables were measured for every class. With a combined cohort population of 27 students, the two variables with 27

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[24] Sam Kash Kachigan, *Statistical Analysis: An interdisciplinary Introduction to Univariate & Multivariate Methods* (New York: Radius Press, 1986), 221–-222.

.responses represent a 100% return for only one course. Although the range of responses is large, the survey return rate for each class was high, ranging from 89–100%.

Table 1.   Network Based Learning Variable Analysis

Variable	N	Mean	Std. Deviation
V-1. Access to instructors was good.	27	6.07	1.107
V-2. The quality of feedback from instructors was good.	27	5.89	1.340
V-3. The timeliness of instructors' responses to questions or comments was good.	51	5.86	1.265
V-4. The content (information & materials) provided on the course website.	203	5.53	1.248
V-5. Being a part of an online "learning community" is an important aspect of my nonresident learning experience.	47	5.51	1.109
V-6. The organization (structure, not content) of the website designed for this course.	179	5.49	1.148
V-7. I regularly read what my classmates post in the discussion section.	178	5.42	1.265
V-8. The design of the course website contributed to my participation in this network-based learning environment.	126	5.39	1.131
V-9. Rate the degree to which the distance learning contributed to your success (knowledge accumulated) in this course.	229	5.38	1.100
V-10. Additional resources and links provided on the course discussions.	124	5.18	1.190
V-11. Online discussion with others in the class.	153	5.14	1.335
V-12. I regularly posted to the online website.	176	5.11	1.364
V-13. I regularly received online comments and assistance from the instructor(s).	178	5.11	1.479
V-14. I regularly reply to instructor's comments or replies to my post.	79	4.97	1.377
V-15. Individual conference rooms on the website.	47	4.15	1.841

The maximum score for each variable is seven. The range for all variable means (4.15–6.07) illustrates an agreement on the importance of each variable on the learning process. To further evaluate the survey results, each variable was assigned to one of three general categories: logistics, participant, and instructor. Logistics included variables related to the technology of network-based learning. Student interactions were placed in the participant category and activities related to instructors in the instructor

group. By rank order of means, the most significant positive effect on the learning process came from instructors (Table 2) followed by logistics (Table 3), and participant (Table 4). Although the use of grouped variables alone lacks in-depth statistical analysis, it is useful for correlation and regression analysis and has value in the development of Communities of Learning.

Table 2.   NBL Instructor Analysis

Variable	N	Mean	Std. Deviation
V-1. Access to instructors was good.	27	6.07	1.107
V-2. The quality of feedback from instructors was good.	27	5.89	1.340
V-3. The Timeliness of instructors' responses to questions or comments was good.	51	5.86	1.265
V-13. I regularly received online comments and assistance from the instructor(s).	178	5.11	1.479

Table 3.   NBL Logistics Analysis

Variable	N	Mean	Std. Deviation
V-4. The content (information & materials) provided on the course website.	203	5.53	1.248
V-6. The organization (structure, not content) of the website designed for this course.	179	5.49	1.148
V-8. The design of the course website contributed to my participation in this network-based learning environment.	126	5.39	1.131
V-10. Additional resources and links provided on the course discussions.	124	5.18	1.190
V-15. Individual conference rooms on the website.	47	4.15	1.841

Table 4.　　NBL Participant Analysis

Variable	N	Mean	Std. Deviation
V-5. Being a part of an online "learning community" is an important aspect of my nonresident learning experience.	47	5.51	1.109
V-7. I regularly read what my classmates post in the discussion section.	178	5.42	1.265
V-11. Online discussion with others in the class.	153	5.14	1.335
V-12. I regularly posted to the online website.	176	5.11	1.364
V-14. I regularly reply to instructor's comments or replies to my post.	79	4.97	1.377

The final descriptive analysis performed focused on the estimated amount of online time, in hours, spent per week for each course (Table 5). A mean of 5.88 hours is not unusual, however, the range of one to thirty hours of online time is worthy of additional review. A comparison of means using the amount of online time as the dependent variable with courses and participants as predictor variables reveal that mean times by course ranged from 5.12-9.63 hours and means by participant ranged from 3.93-10.25 hours. Nothing significant was noted with this additional analysis.

Table 5.　　NBL Online Time

Variable	N	Min	Max	Mean	Std Deviation
Estimate the amount of online time spent, on average, per week on this course.	208	1	30	5.88	4.522

C.　　CORRELATION ANALYSIS

In addition to measures of central tendency and differences in individual variables, an assessment of correlation coefficient between the criterion variable and predictor variables was completed (Table 6). The correlation coefficient r can range in value from -1.00 to +1.00. A correlation coefficient of $r = +1.00$ signifies a perfect positive linear relationship. A correlation coefficient of $r = -1.00$ indicates a perfect negative or inverse linear relationship between two variables. Both positive and negative

perfect correlations allow us to predict exactly a variables score if we know the score of the other variable. The closer the absolute value to 1.00, the stronger the relationship between variables.[25]

The bivariate correlation analysis revealed several strong relationships between variables. The paired combinations of access to instructors (V-1), quality of instructor feedback (V-2), and timeliness of instructor responses (V-3) had the strongest r-values. The relationship between access to instructors and instructor feedback had a very strong correlation of $r = 0.836$; the timeliness of instructor responses and access to instructors was $r = 0.796$; and quality of feedback and timeliness of instructors response was $r = 0.785$.

A review of the correlation coefficient for the criterion variable, where students were asked to "rate the degree to which the distance learning contributed to your success (knowledge accumulated) in this course" (V-9), shows that thirteen of the fourteen variables had significance at the 0.01 level and one variable (V-15) at the 0.05 level. The two greatest correlation values involved instructor access (V-1) and instructor feedback (V-2) at $r = 0.781$ and $r = 0.721$ respectively. Reviewing the correlation coefficients of the variables in the selected groups of instructors, logistics, and participants showed no identifiable trends. A review of time spent online reveals little correlation to the success of Networked Based Learning ($r = .114$). This finding is surprising given the very nature of web-based interaction. The hypothesis that amount of online time is correlated to success in an online course requires additional research. This finding is also important in the development of a strategic plan and implementation framework. The perception by stakeholders that Communities of Learning require significant online commitment may lead to unwarranted concern of adding additional requirements on employees.

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[25] Kachigan, *Statistical Analysis*, 204.

Table 6.   Pearson Correlation

	V-1	V-2	V-3	V-4	V-5	V-6	V-7	V-8	V-9	V-10	V-11	V-12	V-13	V-14	V-15	Time
V-1	1	.836	.796	.700	.(a)	.509	.(a)	.(a)	.781	.617	.504	.(a)	.(a)	.493	.(a)	-.079
V-2	.836	1	785	.528	.(a)	.331	.(a)	.(a)	.721	.601	.431	.(a)	.(a)	.567	.(a)	-.206
V-3	.796	.785	1	.610	.(a)	.484	.(a)	.(a)	.494	.461	.303	.(a)	.(a)	.484	.(a)	-.145
V-4	.700	.528	.610	1	.129	.753	.365	.610	.607	.598	.522	.231	.337	.289	.379	.006
V-5	.(a)	.(a)	.(a)	.129	1	.274	.637	.310	.556	.423	.464	.085	.150	.(a)	.295	.329
V-6	.509	.331	.484	.753	.274	1	.310	.592	.494	.543	.463	.135	.259	.214	.289	.064
V-7	.(a)	.(a)	.(a)	.365	.637	.310	1	.405	.470	.164	.384	.299	.233	.104	.188	.076
V-8	.(a)	.(a)	.(a)	.610	.310	.592	.405	1	.587	.429	.463	.424	.444	.306	.155	.103
V-9	.781	.721	.494	.607	.556	.494	.470	.587	1	.589	.578	.273	.321	.367	.361	.114
V-10	.617	.601	.461	.598	.423	.543	.164	.429	.589	1	.384	-.007	.233	.206	.450	.180
V-11	.504	.431	.303	.522	.464	.463	.384	.463	.578	.384	1	.389	.366	.217	.536	.160
V-12	.(a)	.(a)	.(a)	.231	.085	.135	.299	.424	.273	-.007	.389	1	.456	.373	.099	.205
V-13	.(a)	.(a)	.(a)	.337	.150	.259	.233	.444	.321	.233	.366	.456	1	.547	.186	.101
V-14	.493	.567	.484	.289	.(a)	.214	.104	.306	.367	.206	.217	.373	.547	1	.(a)	.248
V-15	.(a)	.(a)	.(a)	.379	.295	.289	.188	.155	.361	.450	.536	.099	.186	.(a)	1	.202
Time	-.079	-.206	-.145	.006	.329	.064	.076	.103	.114	.180	.160	.205	.101	.248	.202	1

Variables 1-15 indicate the variables listed in Table 1
**   Correlation is significant at the 0.01 level (2-tailed).
**   Correlation is significant at the 0.05 level (2-tailed).
a   Cannot be computed because at least one of the variables is constant.

Limitations exist in interpreting correlation. The mere existence of correlation between two variables does not imply causality. It is possible that associated variables are responsible for the observed correlation, either completely or in part. A multiple regression analysis assists in understanding the degree to which predictor variables account for variation in the criterion variable.

D.   REGRESSION ANALYSIS

For the purpose of this research, regression analysis was used to assess the relative importance of the various predictor variables in their contribution to variation in the criterion variable (Table 7). The value of R is used to illustrate the relationship between predictor variables and the criterion variable. R can range from 0 to 1, with the larger the value of R the stronger the relationship. R squared is the proportion of variation in the predictive variable ranging from 0 to 1. Small values of R^2 indicate that the variables do not fit well. The model of choice is one with a high R^2 value and the

least amount of predictor variables. Adjusted R^2 attempts to correct R^2 to more closely reflect the goodness of fit. For this research, R^2 was the determining factor in model selection.[26]

Table 7.   Multiple Regression Analysis

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
All Variables	.798	.637	.549	.739
Logistics	.731	.534	.474	.709
Participant	.684	.468	.396	.742
Instructor	.397	.157	.142	1.019

The "all variables" analysis in Table 7 represents all the predictor variables identified in this chapter. An R = .798 and R^2 = .637 represent a strong relationship between the success of distance learning and the variables that are measured in the CHDS post course surveys. The relationship affects this research in two significant ways. First, the strong predictive relationship validates the variables measured. Critical to an effective survey is the relationship between the variables measured. Secondly, the relationship provides a benchmark for development of a Community of Learning model. The relationship is not, however, complete. Additional analysis is necessary to determine the weight of individual variables.

1.   Grouped Variable Analysis

In addition to an analysis of all variables, predictor variable groups were reviewed to identify any significance in the areas of logistics, instructor, and participant (Table 7). The subgroups have potential to allow for a greater control in the strategic plan over potential hardware, software, and policy issues. As discussed earlier the limited number

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[26] SPSS Software was used for all of the statistical calculations. Advice and recommendations on model selection are contained within the software tools. SPSS Student Software 11.0 and SPSS Version 14.0 Trial were both used for the regression portion of the analysis.

of responses in certain predictor variables prohibited the completion of a true regression analysis related to instructor involvement. The mean was used to replace missing data in this sub-group.

The logistics subgroup variables showed the greatest relationship to the success of distance learning ($R^2 = .534$). The participant subgroup followed with $R^2 = .468$. It is interesting to note that instructors, which showed high mean scores, had the lowest relationship to the success of distance learning ($R^2 = .157$). This may be a result of problems with missing data. To better understand the results of the instructor related sub-group, additional research is necessary as more CHDS Cohorts complete course evaluations.

2.   Stepwise Analysis

A stepwise analysis was used to identify the predictor variables with the greatest influence on the criterion variable. This analysis has the potential to identify key variables to consider in development of Communities of Learning. The variables also provide areas of assessment for the proposed pilot program. For this research, both forward addition and backward elimination regression methods were used. In the forward addition process, the predictor variable accounting for the most variance in the criterion variable is selected. Then one at a time, variables that account for most of the remaining variance are added. Variables continue to be introduced until the resulting increase in R^2 becomes insignificant. The backward elimination method attempts to identify key predictor variables by starting with all variables and eliminating the least predictive variable one by one until the elimination of another variable would sacrifice a significant amount of explained variance in the criterion variable. [27] Both methods were selected as a way of comparing outcomes for inclusion in the planning process of Communities of Learning.

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[27] Kachigan, *Statistical Analysis*, 263–264.

Both the forward addition and backward elimination regression analysis for all variables identified the same five predictive variables accounting for the greatest influence on the success of distance learning (Table 8). The five identified contained variables from all three subgroups including two from logistics (V-4 & V-10), two related to participant activity and interaction with fellow students (V-7 & V-11), and the timeliness of instructor responses (V-3) from the instructor subgroup. Noticeably missing are the two instructor variables with the greatest mean values (V-1 & V-2). The results of this analysis provide insight into elements that may be necessary in the development of the Community of Learning model.

Table 8.   Stepwise Regression Analysis

Predictor Variables with the Greatest Influence	R	R^2	Adjusted R^2
V-3 The timeliness of the instructors' responses to questions or comments was good V-4 The content (information and materials) provided on the course website. V-7 Regularly read what my fellow classmates post in the discussion sessions. V-10 Additional resources and links provided on the course website. V-11 Online Discussions with others in the class.	.683	.467	.455

Of interest to the research is the degree to which variables within each sub-group had the greatest influence on the criterion variable. A stepwise analysis within each category of variables identified the best combination of variables to influence the criterion variable. The logistics variable group identified (V-10) "additional resources and links" and "the organization of the web site" (V-6) with an R^2 = .485. The predictor variable model best suited for participant involvement (R^2 = .421) included "being a part of an online learning community" (V-5) and "online discussions with others" (V-11). The instructor variable model R^2 = .150 included, variables (V-13) "I regularly received online comments and assistance from the instructor(s)" and "access to the instructors was good" (V-1). While some of these variables were not identified in the all variables analysis, they must be considered in the development of Communities of Learning.

E. RESEARCH LIMITATIONS

The use of CHDS post-course survey data is not without limitations and potential bias. The use of graduate level students from Emergency Responder disciplines is not necessarily a representative sample of the larger population of Emergency Responders. The selection process for enrollment at CHDS is rather rigorous with an emphasis on individuals actively involved in the Homeland Security field who possess the academic and leadership skills necessary to complete the Master's degree program. A significant number of the students in Cohorts 0501/0502 hold postgraduate degrees. Additionally most have reached upper management positions in their agencies, which adds additional separation from the population.

Another source of potential bias exists in the evaluation system at CHDS. Most of the courses offered at CHDS require, measure, and reward online activity as part of the grading system. Using online activity as a grade requirement may unintentionally bias participation. A critical component of Communities of Learning is voluntary online participation. Any correlations between the success of Networked Based Learning and participation require scrutiny as they relate to the creation of Communities of Learning.

The format of CHDS requires two weeks in residency every quarter. The face-to-face interaction between students and instructors may create an environment that influences participation. While this interaction is not unique to CHDS, variations in physical contact between students and instructors require consideration in the design and implementation of Communities of Learning.

The self-reporting of average weekly online time committed to Networked Based Learning ranged from one to thirty hours per course. The mean was almost six hours per week per course. With at least two courses per quarter the mean amount of time per week devoted to online participation was nearly twelve hours. This level of commitment to online activity is unreasonable for Community of Learning participants. It will be critically important during the development of Communities of Learning that reasonable levels of participation are established and evaluated during the pilot period.

F.   CONCLUSIONS AND IMPLICATIONS

The CHDS' Networked Based Learning application is similar in structure and application to Communities of Learning. The basic characteristics of distanced based learning combined with collaboration technologies provide a basis for evaluation and potential future benchmarking. Although the CHDS analysis has application limitations, the application of identified variables such as "timely instructor feedback and interaction" provide lessons for potential use in Communities of Learning. The stepwise regression provides areas of inclusion in the model development and pilot offered in Chapter V. Lessons learned and evaluations provided from CHDS will need continued review and inclusion as data becomes available.

The survey analysis demonstrates a strong relationship between success at CHDS and the use of NBL. Significant correlations exist in the areas of logistics and participant interaction.   Although limitations exist as identified above, the high degree of predictability in some areas provides optimism that Communities of Learning have potential to experience the same degree of success.

The analysis of NBL provides a look into the use of e-learning and collaborative technologies by CHDS participants. The assessment offers a level of comfort in predictability of particular variables and the potential application in Communities of Learning. What is missing is the potential influence of future events on the success of Communities of Learning. The next phase of analysis involves the use of futures forecasting to identify trends and events that have potential to influence Homeland Security Communities of Learning.

The NBL assessment in this chapter and the Nominal Group Technique used in the following chapter will assist in the development of a more thorough strategic plan and implementation framework for Communities of Learning.

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III. FUTURES FORECASTING & NOMINAL GROUP TECHNIQUE

A "vision for the future" is a phrase often used to describe an organization's goal of making decisions today, not based on current conditions but on a vision of where the organization desires to be in the future. This chapter uses futures forecasting to identify issues, which may exist in the future that have potential to influence communities of learning. When combined with a review of current conditions a vision for the future allows for more comprehensive planning.

A. THE NOMINAL GROUP TECHNIQUE

Futures forecasting is the study of the future for the purpose of making decisions and taking action today that will influence the design of tomorrow. Futures forecasting utilizes environmental scanning, trend analysis, and scenario building to develop direction, strategies, and steps necessary to move into the envisioned future. For this research, Nominal Group Techniques was used as the tool for futures forecasting.

Developed in 1968 by Andre L. Delbecq and Andrew H. Van de Ven, nominal group technique (NGT) blends the benefits of brainstorming with the advantages of quick decision-making. An NGT is a structured workshop that brings together panelists in order to identify trends and events as they relate to the issue of discussion. Participants are lead by a facilitator through a tightly structured process that produces a ranked list of ideas with each participant providing information from her or his perspective.[28]

Participants in the NGT Process are instructed to be nonjudgmental and to abstain from providing commentary while others are sharing personal thoughts. After a brainstorming of ideas, the group discusses all of the ideas presented with an emphasis on clarification and understanding. The result is a priority ranking of the ideas by order of importance and magnitude. The advantage of NGT is that this format "provides equality of participation among group members. In a less structured group, personality or status

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[28] Virginia Kidd and Rick Braziel, *COP Talk: Essential Communication Skills for Community Policing* (San Francisco: Acada, 1999), 124–128.

differences often sway the direction of group discussion."[29]   Critical to equality of participation is strong facilitation. The facilitator must be sensitive to group dynamics prior to and during the NGT. Advance planning includes panel member selection and the need to develop techniques that limit opportunities for participants inappropriately influencing others.

For this thesis, NGT was used to develop and identify trends, issues, and events related to the development of Homeland Security Communities of Learning. The goal was to identify potential trends and future events that may affect the development and use of Communities of Learning. Critical to the development of Communities of Learning is a vision for the future. The trends and events identified during the NGT assist in the development of a strategic plan and implementation framework.

The panel represented a diverse group of nine professionals with experience in private business, education, law, law enforcement, fire, and local and state government. Members were selected for their expertise in training and Homeland Security.   The optimal panel size for this research was determined to be nine. Research shows "A group made up of less than five members lacks resources in terms of the number of critical judgments available to analyze the problem and arrive at a decision. On the other hand, adding beyond ten members often does not increase group accuracy…"[30]

The members of the panel were advised in advance of the NGT process including a definition of trends and events along with a general overview of the process. The research question provided to each panel member was, "Can a Homeland Security Community of Learning be created utilizing collaborative technologies that allow for information sharing that leads to enhanced capabilities and innovation?" Each participant considered this question when identifying trends and events as part of the NGT process.

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[29] Arthur B. Van Gundy, *Techniques of Structured Problems Solving*, 2nd ed. (New York: Van Nostrand Reinhold, 1988), 345.

[30] Andre L. Delbecq, Andrew H. Van de Ven, and David H Gustafson, *Group Techniques for Program Planning: A Guide to Nominal Group Technique and Delphi Process* (Glenview, Ill.: Scott, Foresman, 1975) 70.

Prior to discussing trends and events panel members were provided with the definitions of e-learning, communities of practice, and Communities of Learning. The panel also discussed a variety of collaboration technologies including email, instant messaging, and chat rooms.

1. Interpreting Trends

For the purpose of the NGT a trend is defined as a series of incidents or events taking place that appear to indicate the direction of a particular event. Trends must be relevant to the issue and clearly stated in terms defined and understood. Trends can be social, technological, economic, environmental, or political.

After identifying trends having the greatest potential to affect the issue statement, participants assign the arbitrary value of 100 as a baseline measurement for the current condition of each trend. A trend direction is then determined by each panelist who evaluates the direction of each trend by using values less than, equal to, or greater than 100 viewed in five-year intervals starting with five years into the past, along with five and ten years into the future.

Lastly, participants provided a level of concern for each trend as it relates to the research question. Levels of concern may range from 1 for little to no concern, to 10 for high concern of the trend affecting the research question.

In the example below (Table 9) the first trend (Tr-1), is perceived as approximately 25% greater today than five years ago (75) and 50% greater in five years compared to today (150). The trend continues to double over the next ten years. The trend inclines and with a concern score of 9 may significantly influence the issue discussed. Trend 2 (Tr-2) illustrates a steadily declining trend with a significant decline over the last five years leading up to the present and a slowing over the next ten years. The last example trend 3 (Tr-3) demonstrates a bi-directional trend with an increase of 50% over the last five years with a decline to follow over the next ten years. The concern level of 2 for trend three (Tr-3) indicates low concern that the trend will influence the issue discussed.

Table 9.   Sample Trend Analysis

Trend (Tr)	-5 Yrs	Today	+5 Yrs	+10 Yrs	Concern 1-10
Tr-1	75	100	150	200	9
Tr-2	250	100	85	75	5
Tr-3	50	100	75	25	2

2.   Interpreting Events

For the purpose of this NGT, an event is defined as an unambiguous, confirmable occurrence that has potential to change the future. After identifying events that have the greatest potential to affect the issue, panel members are instructed to project the first year when they believe an event has a 1% chance of occurring (Year>0). Each participant is asked to estimate the event's probability of occurrence by assigning a value between 0% and 100%, for five years (Year +5) and ten years (Year +10) into the future.   The panelists conclude their assessment of events by determining impact of each event on the research question. The impact of each event is measured with a range between -10 and + 10 with -10 having the greatest negative impact and +10 the greatest positive impact on the issue.

In the example below (Table 10), the first event (Ev-1) is determined to have the first possibility of a 1% chance of occurring in year three. The probability of event one (Ev-1) occurring by year five is 50% with 100% probability of occurrence within ten years. The impact of the event on the issue statement is projected to be moderate to high in a positive way (+7). Event 2 (Ev-2) is estimated to have the first possibility of a 1% chance of occurring in year seven and therefore it has zero probability of occurring in the first five years. The probability of Ev-2 occurring between years 7 and 10 is 25% and the influence of such occurrence would be mildly negative (-3). The last example event has no likelihood of occurring over the next ten years and therefore would have no immediate influence on the issue.

Table 10.   Sample Event Analysis

Event (Ev)	Year(s)>0 1st year Possible	+ 5 Years	+10 Years	Impact -10 to +10
Ev-1	3	50%	100%	+7
Ev-2	7	0%	25%	-3
Ev-3	15	0%	0%	+2

3.   Interpreting Cross Impact Analysis

The cross impact analysis assesses each event and its potential effect on each individual trend. The influence on the issue discussed is assigned a value ranging from -5 to +5: minus five represents the extreme value for a negative impact and +5 indicating an extreme positive impact on the issue. A rating of zero represents no influence.

In the example below (Table 11), event one (Ev-1) affects trend one (Tr-1) in a manner that influences the issue statement in an extremely positive way (+5). A negative influence on the issue statement is evidenced by event two's (Ev-2) effect on trend three (Tr-3). Neutral examples of influence on the issue statement include Ev-2's effect on Tr-2, and Ev-3's effect on Tr-3.

Table 11.   Sample Cross Impact Analysis

	Tr-1	Tr-2	Tr-3
Ev-1	+5	+3	+1
Ev-2	+2	0	-2
Ev-3	+1	+2	0

B.   NOMINAL GROUP PANEL RESULTS

1.   Trends

Each panel member was given time to generate ideas about trends that may relate to the research question. Using NGT, the members presented each of his or her ideas until the group felt that the list adequately covered the issue. The panel identified 32 trends. The group selected, by vote, six trends they believed had the greatest potential effect on the research question (identified as Tr-1 through Tr-6 and listed in Table 12). A synopsis of the panel discussion for each trend is provided below.

Finally, participants provided a level of concern for each trend as it relates to the research question. Levels of concern may range from 1 for little to no concern to 10 for high concern of the trend affecting the research question. Corresponding medians for the group individual scores are listed in Table 12.

Table 12.   Trend Analysis

Trend	-5 Yrs	Today	+5 Yrs	+10 Yrs	*Concern 1-10*
Tr-1	75	100	125	185	8
Tr-2	60	100	150	160	7
Tr-3	50	100	125	150	8
Tr-4	50	100	115	130	9
Tr-5	80	100	120	130	7
Tr-6	65	100	135	150	5

Tr-1   Technological advances throughout the world.
Tr-2   Accessibility to personal electronic communication devices.
Tr-3   Number of U.S. residents with a role in the Homeland Security mission.
Tr-4   Federal funding for Homeland Security.
Tr-5   Universal training and response standards for Emergency Responders.
Tr-6   Flexible work schedules.

a.   Tr-1 Technological Advances throughout the World

The first trend (Tr-1) identified by the panel was general technological advances. The panel discussed the exponential rate at which technology is being developed and applied. This speed contributes to an increased need to stay current on developments and constantly watch the horizon for the latest work place application.

The panel also discussed the use of technology in the field. Mobile computers combined with wireless technologies allow for increased information sharing both in volume and in speed. In particular, a Sacramento law enforcement agency has capabilities for intranet and Internet access for field personnel through a department-supported radio infrastructure. The bandwidth is capable of Internet access and therefore potential to support a Community of Learning from in the field.

Advances in technology also allow for creative solutions to the problem of updated training for Emergency Responders. The panel felt that continued advances in

technology along with a more technologically perceptive workforce would improve opportunities for development of Communities of Learning.

The panel felt that advances in technology would continue at about the same pace as the last few years but would climb after five years. The median for "+10 years" was 185 with three participants recording a 200% to 300% increase over the next 10 years. The panel identified the median concern level at eight with some members scoring concern at ten.

b.   Tr-2 Accessibility to Personal Electronic Communication Devices

The increased use of personal communication devices appeared to indicate a separate trend from general technology. A personal communication device was defined as a portable cell phone or PDA with Internet capabilities. Increased accessibility to work, home, and family through personal communication devices was discussed in both a positive and negative context. The mobility of these devices allows for increased freedom from the traditional Monday through Friday work environment. The ability to receive phone calls, text messages, access to an electronic calendar, notebook, phonebook, send and receive email, and access the Internet, all with one device, greatly improves efficiency and effectiveness. The ability to communicate with others, conduct work, and participate in training from virtually anywhere was determined to be a positive benefit for Communities of Learning.

Increased accessibility was determined as a negative circumstance. The panel expressed frustration with the amplified pace of work resulting from increased electronic accessibility. Conversations took place describing electronic accessibility as an intrusive event into a person's private time creating a 24-hour employee.

The concept of an electronic "leash," tethering a person to a device that interferes with personal time, requires managing. Merely advocating and directing employees to use an e-learning tool may not be wise without a well-thought-out implementation plan.

The panel was consistent in assessing a flattening of the trend line from years five (150) to ten (160). This flattening followed an increase of nearly 50% from the

baseline of 100 today to 150 at year five. The concern levels had a range of a low three to a high concern of 10 with no identifiable reason for the disparity. The median concern level for the use of personal communication devices was moderately high (7).

c. Tr-3 Number of U.S. Residents with a Role in the Homeland Security Mission

The third trend (Tr-3) identified the number of U.S. residents with some level of responsibility, role, or mission in the area of Homeland Security. The panel felt that prior to September 11, 2001 Homeland Security was the role of the federal government with the military and CIA responsible for overseas operations, and the FBI responsible for domestic counterterrorism investigations. The responsibility of state and local government was to support the FBI, with the private sector having little to no role in protecting Americans.

An increased role for organizations and individuals in Homeland Security creates the need to share information between government organizations, private sector, and community members. The increase in roles also creates additional demand on an already overwhelmed training system. As more people become involved, the requirement for consistency in information collection, training, and technology increases. The panel discussed the ability for Communities of Learning to provide the necessary consistency in both training and technology while at the same time creating capacity to meet the increased demand.

The panel's views consistently showed a 100% increase from 5 years ago to present and a steady increase to 125 in five years and 150 in ten years. The concern level of this trend on the research question rated a median of seven. Not reflected in the scores is the need to train community members who have a role in Homeland Security and who are not members of the Emergency Responder disciplines. The void that exists in funding and accessibility to training was discussed in relation to e-learning technologies and the ability to receive low to no cost training through Communities of Learning.

d.   *Tr-4 Federal Funding for Homeland Security*

The issue of federal funding to state and local governments for Homeland Security was Trend 4 (Tr-4). With the increased number of people directly involved in Homeland Security (Tr-3), the panel discussed the importance of continued federal funding. As background, Sacramento became an area eligible for Urban Area Security Initiative (UASI) funding starting in 2003. This designation is at risk when Sacramento was placed on the USAI sustainment-funding list in 2006.

The panel discussed the importance of continued funding to create Communities of Learning and develop Homeland Security curriculum. The panel acknowledged that the lack of continued funding would make distance learning even more important from a fiscal perspective. The panel also discussed the opportunity to collaborate with the Community College district to create training revenue through accredited courses. The accreditation of courses would be an additional incentive for Community of Learning participation from those who desire college credit.

Funding received a very high concern level (9). The individual trend ratings demonstrated disparate views on future funding. All panel members scored the funding level five years ago at or below the baseline of 100 established for today. The trend five years from now varied from a low of 60 to a high of 150. At ten years into the future, the ratings ranged from a reduced level of 60 to an increase of 200. It is interesting to note the panel member (panelist 6) who listed the trend levels at 60 for both future perspectives of five and ten years is the panelist with the greatest involvement in Homeland Security issues. Figure 3 illustrates the range between the panelist with the greatest trend increase (panelist 4) and panelist 6. Both of these panelists were among three members who rated the concern level at the maximum (10).

Figure 3.   Panelist Comparison
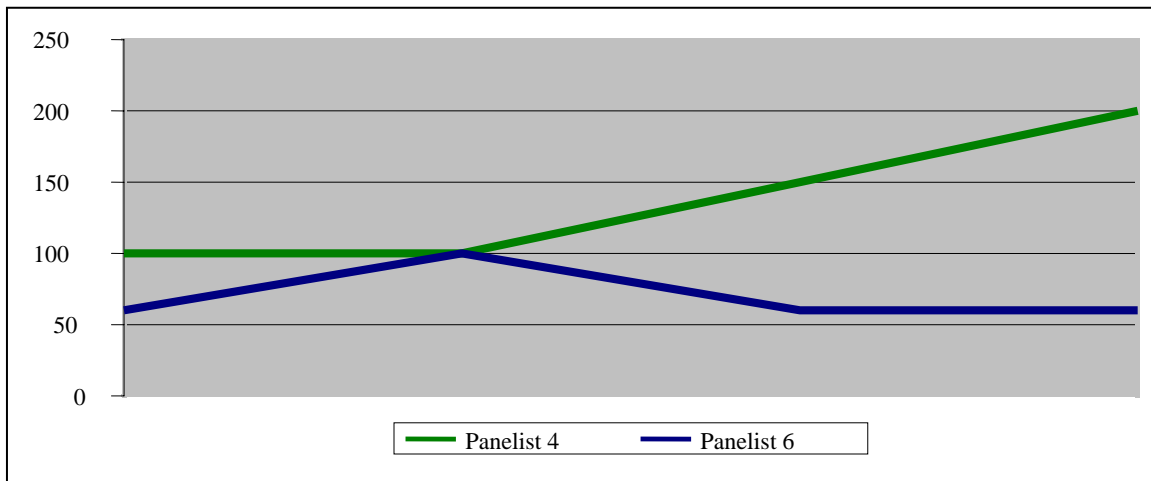
e.   ***Tr-5 Universal Training and Response Standards for Emergency Responders***

The fifth trend (Tr-5) identified by the panel was universal training and response standards within and across Emergency Responder disciplines. The panel felt that there is a conscious attempt to standardize training and response not only across disciplines but also across regions of the country. Panel members, experienced in response to national disasters, discussed the desire of the federal government to train all emergency responders to a consistent level, regardless of discipline.

The impact of such an effort would directly influence Communities of Learning. The ability for Emergency Responders to train and share experiences through a Community of Learning creates flexibility in the training process while reducing costs to a participant's organization. The panel discussed the scheduling problems and costs associated with sending staff to training sites across the country. The concern level for this trend was a moderately high seven.

f.   ***Tr-6 Flexible Work Schedules***

The sixth and final trend (Tr-6) was flexibility of work hours. The panel felt that increased flexibility would enhance the opportunity for Community of Learning participation. They discussed a direct relationship between an individual's control of work schedules and the opportunity to participate in Communities of Learning. The ability to participate in Communities of Learning at times selected by the participant

creates cost saving opportunities for organizations. Participants have the ability to logon to a block of instruction or chat area, and interact for an amount of time prescribed by the participant. Community of Learning participation was compared to traditional classroom instruction where times are predetermined and the student must engage the process during these fixed times. The trend line shows a consistent progression from five years ago (65) to ten years into the future (150). The panel uniformly rated the concern as moderate (5).

2.   Trend Summary

The identified trends can be grouped in three general areas: information sharing, innovation, and cost reduction. Information sharing included those trends that directly related to staffing (Tr-3), standards for workers (Tr-5), and the work environment of employees (Tr-6). As the number of personnel increase, the need for training and collaboration increases. The innovation required to meet these needs is identified in the trends directly concerned with the development or application of devices (Tr-1 and Tr-2). There was one trend directly related to funding (Tr-4). Although, the majority of trends identified opportunities for cost reduction through Communities of Learning. In reviewing all six trends, the panel reported increases over the 15-year range (Figure 4).

Figure 4.   Trend Summary

	-5 Years	Today	+5 Years	+10 Years
Tr-1	75	100	125	185
Tr-2	60	100	150	160
Tr-3	50	100	125	150
Tr-4	50	100	115	130
Tr-5	80	100	120	130
Tr-6	65	100	135	150
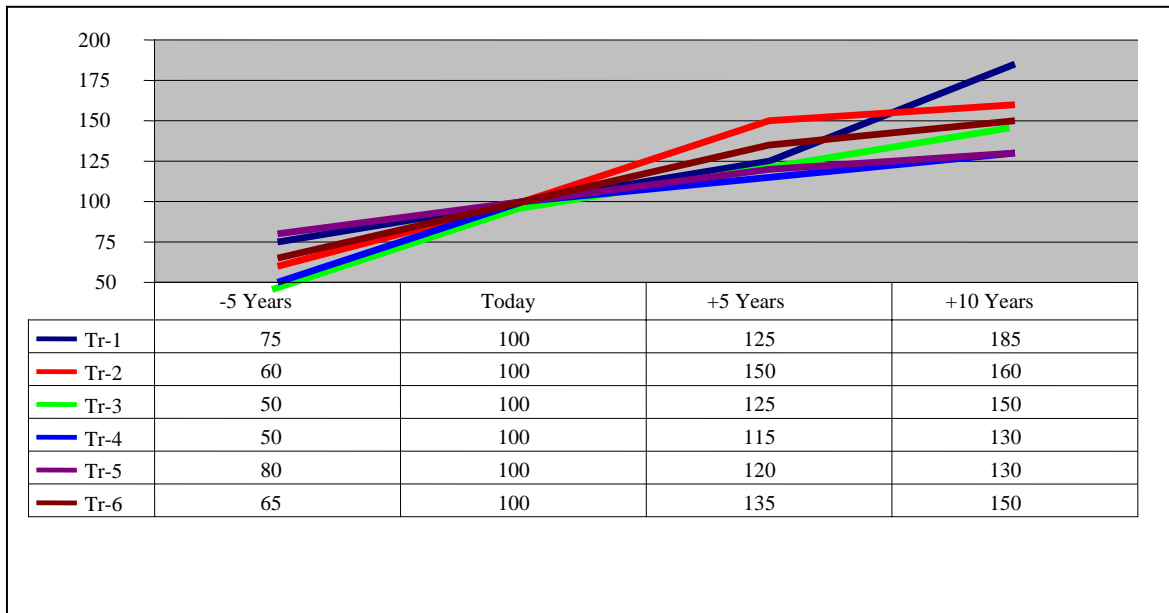
It is interesting to note that the trends with the three greatest recorded levels of concern include one trend from each of the three identified categories (Figure 5). Availability of federal funding (Tr-4) had a concern of 9, advances in technology (Tr-1) was given a concern level of 8, and the number of Americans involved in Homeland Security (Tr-3) measured 8. All three areas have a direct effect on Communities of Learning. As technology advances, opportunities for development and efficiencies of Communities of Learning improve. An increase in the number of people with a role in Homeland Security creates an increased demand for training and collaboration. Both Trends 1 and 8 influence funding in areas of efficiencies and demand. As demand grows, efficiencies must be designed to reduce participant costs.

Figure 5.   Levels of Concern
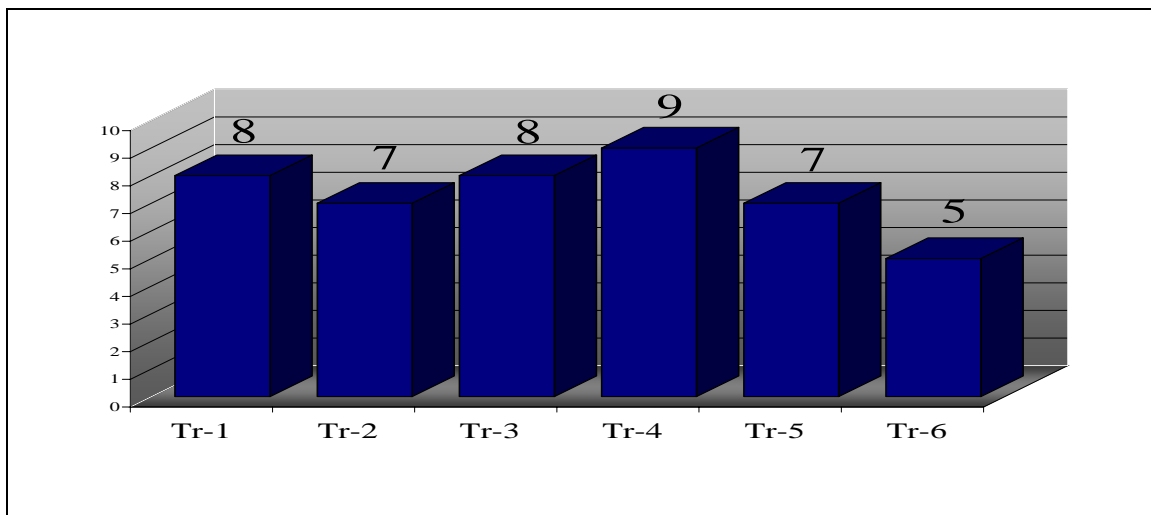
3.   Events

Each panel member was given time to generate ideas about future events that may influence the research question. Using NGT, the members presented each of his or her ideas until the group felt that the list adequately covered the question. The panel identified 16 events. The group selected, by vote, eight events identified as Ev-1 through Ev-8 (Table 13) they felt had the greatest potential effect on the research question. A synopsis of the panel discussion for each event is provided below.

Finally, participants provided a level of impact for each event as it related to the research question. Levels of impact may range from 1 for little to no impact, to 10 for high impact of the event affecting the research question. Corresponding medians for scores are listed in Table 13.

Table 13.   Event Analysis

Event (Ev)	Year(s)>0 1st year Possible	+ 5 Years	+10 Years	Impact -10 to +10
Ev-1	3	40%	60%	+5
Ev-2	4	25%	50%	-8
Ev-3	20	0%	0%	-5
Ev-4	1	25%	40%	-5
Ev-5	3	10%	50%	+8
Ev-6	7	0%	10%	+5
Ev-7	1	5%	20%	+10
Ev-8	10	0%	0%	-4

Ev-1 Pandemic hits United States.
Ev-2 Sabotage disables Internet.
Ev-3 Artificial intelligence implant available.
Ev-4 Computer virus deletes nationally shared databases.
Ev-5 Gasoline cost exceeds $20.00 gallon.
Ev-6 Nationalized Public Safety Agency.
Ev-7 Assassination of the President of the United States by international terrorists.
Ev-8 Worldwide antiwar treaty.

a.   *Ev-1 Pandemic Hits United States*

The first event (Ev-1) identified by the panel was a pandemic in the United States. The panel discussed the strong likelihood that a pandemic would again occur in the United States with significant consequences. The aging population of baby boomers would produce a large number of victims. These victims would create a surge that the medical and public health communities would not be able to handle. Included in the conversation is the lack of preparedness to handle quarantines. It was the consensus of the group that Communities of Learning would provide an opportunity to share pandemic response plans and exchange real-time information through an established communication network.

The panel identified three years as the first opportunity when the probability of a pandemic within the U.S. reached 1% and a 60% chance of occurring within the next ten years. Although a pandemic was described as a catastrophic event, the impact on the research question was moderately positive (+5). The panel discussed the opportunities for Communities of Learning to fill the gap in planning, specifically in the area of the Emergency Responders' role in a mandatory quarantine. Communities of Learning would also add a communication value during an event as participants share strategies for response and recovery.

b.   Ev-2 Sabotage Disables Internet

The second event discussed was the disabling of the Internet through sabotage (Ev-2). The panel consistently established the probability of a successful Internet attack reaching 1% at year four with a 50% probability of occurring within the next ten years. The group felt that such an attack would have a significant negative affect (-8) on Communities of Learning. The group discussed the relationship between the technology trend (Tr-1), the increased use of personal communication devices to access the Internet (Tr-2), and the increased reliance on the Internet for work and personal use as increasing the value of the Internet as a target for terrorists. A considerable amount of time was spent discussing motivations and goals of terrorist attacks. The majority of the panel agreed that the number of causalities is important to a terrorist; however, the greater goal is to affect the economy. A successful attack on the Internet was seen as one of the best ways to accomplish economic terrorism.

Disabling of the Internet was seen as doing the most harm to Communities of Learning. The loss of the Internet would cripple the ability to conduct nationwide training and collaboration through Communities of Learning. The loss, however, would not be unique to Communities of Learning. All Internet-based training, data collection, information sharing, and communications systems would suffer the losses.

c.   Ev-3 Artificial Intelligence Implant Available

The third event (Ev-3) was the ability to implant an artificial intelligence device in a human. Although identified as an event that would influence the research question, none of the panel members felt the probability of this event reaching 1% in the

next ten years. The range for the first year probability was 15 to 100 years, with five panel members identifying 20 years as the first year of probability. The artificial intelligence impact on the research question was identified as moderately negative (-5). [31]

d.   Ev-4 Computer Virus Deletes Nationally Shared Databases

The fourth event (Ev-4) identified was a computer virus that deletes nationally shared databases, including Communities of Learning. The first year of probability reaching 1% was identified as year one with a probability of occurrence of 25% in the first five years and 40% in the first ten years. The probability for the event occurring within ten years was interesting due to the wide range, with a low probability of 7%, and a high probability of 100%. An interesting observation within these rankings is that the more reliant the panel member's agency is on technology, the greater the panel member rated probability at both the five and ten year intervals. This observation did not hold true for probability of first occurrence or impact on the research question. The median impact score for a virus destroying critical databases was moderately negative (-5).

The panel discussed the increased reliance on technology and the concern surrounding IT security. The primary concern was the lack of IT security at the municipal government level. Participants believed that this was particularly true in public safety agencies where hiring primary public safety providers is more appealing to local elected officials than hiring additional support staff. Several agencies have trained public safety professionals to do IT work with limited success. The panel agreed that a low priority on information security is increasing vulnerability at a time of increased reliance on technology. The lack of attention would have a negative effect on Communities of Learning if organizations had concerns that participation in a Community of Learning created risk exposure to their IT systems. This concern could result in reduced participation, loss of collaboration, and the potential increase in costs as efficiencies of Communities of Learning are not fully realized.

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[31] The NGT facilitator may have unintentionally introduced this event. As an example of events, the facilitator introduced a list of sample events that included the use of nanotechnology and medical implants.

e. *Ev-5 Gasoline Cost Exceeds $20 Gallon*

The fifth event (Ev-5) identified by the panel was an increase in gasoline prices to a level that alters the way Americans use vehicles. Originally, the price per gallon was established at $100 a gallon. Such a high per gallon cost created a first year probability that exceeded the ten-year window. To capture measurable data while also keeping within the intent of changing driving/commute behaviors, the price was set at $20 per gallon. The panel believed that dramatically increasing gasoline costs had a direct relation to reduced travel including work commutes, employment-related day-to-day driving, business travel, and in particular, discretionary training. As gasoline prices rise there would be an incentive to look for alternatives to reduce travel. Communities of Learning would be a reasonable alternative to save fuel and reduce expenditures, while at the same time improving collaboration as employees become increasing reliant on technology for communication.

The panel identified the probability of gasoline topping $20 per gallon reaching 1% in year three. The probability was established at 10% at five years and 50% at ten years. As discussed by the group, the increased cost of gasoline would have a significant positive impact on the research question (+8).

f. *Ev-6 Nationalized Public Safety Agency*

The sixth event (Ev-6) identified by the group was the nationalization of public safety agencies. The definition of public safety agencies was limited to law, fire, and emergency medical. The probability of this event exceeding 1% was determined to be seven years with a 10% probability of occurring within ten years. The group felt that this event would have a moderately positive impact on the research question (+5).

The panel spent some time discussing the merits of such an event. Some members believed the failures in New Orleans could have been eliminated with a single response entity. The command and control components within such an entity would be easier to synchronize than multiple agencies representing multiple disciplines. The dissenting opinion was that local control is necessary and nationalized public safety actually interferes with capabilities by adding competing priorities. Despite the disagreement on utility of nationalized public safety, the panel was consistent that this

event would have a moderately positive affect on the research question (+5). The panel felt the need for consistency of training effort would require a system that a Community of Learning could deliver. Additionally the need for nationwide collaboration across disciplines, within a system agile and robust enough to reach large, diverse, and growing audience could also be met by Communities of Learning

g. Ev-7 Assassination of the President of the United States by International Terrorists

The seventh event (Ev-7) was the assassination of the President of the United States by international terrorists. Disturbing as this may seem, it had the greatest positive impact on the research question (+10). The panel concluded that a terrorist attack killing the President would create a reaction from the United States that would include the expansion of counter-terrorism training and response capabilities. The increased training demand and need for information sharing would add value to Communities of Learning. The panel identified year one as the first year that the probability of this event occurring reaching 1%. The likelihood of a Presidential assassination occurring within five years was 5%, and at 10 years 20%.

h. Ev-8 Worldwide Antiwar Treaty

The last event identified (Ev-8) by the panel was the signing of a worldwide antiwar treaty. Nicknamed "world peace" by the panel, the event was given no probability of occurring in the next ten years although year 10 was identified as the first year of the probability reaching 1%. There was limited discussion about "world peace" other than the likelihood of occurrence was small. World peace was determined to have a negative impact (-4) on the research question. The panel felt the catalyst behind communities of practice was Homeland Security and any reduced need in Homeland Security would have a direct relationship to Communities of Learning.

4. Event Summary

A review of the events selected by the panel identified several areas for discussion and consideration during the model development phase of the research. Table 14 was constructed to illustrate the probability of an event occurring within the next ten years, whether the event itself would be considered negative, positive, or neutral by the public, and how the event affected Communities of Learning

From a public perspective, five of the eight events were considered to be negative, two positive, and one (Ev-6) was considered positive by some and negative by others. However, negative events did not necessarily result in a negative effect on the research question. If a negative event involved technology, the result was a negative influence on the research question. If the negative incident involved non-technology events, the effect on the research question was positive. For example, the assassination of the President is a very negative event. However, the effect on the research question was considered very positive. A review of the two events rated as positive to the public (Ev-3 and Ev-8) resulted in negative effects on the research question. However, both events were considered as having no probability of occurring within the next ten years.

Table 14.   Event Summary

	Public View	Affect on Question	Probability
Ev-1	Negative	Positive 5	60%
Ev-2	Negative	Negative 8	50%
Ev-3	Positive	Negative 5	0%
Ev-4	Negative	Negative 5	40%
Ev-5	Negative	Positive 8	50%
Ev-6	Mixed	Positive 5	10%
Ev-7	Negative	Positive 10	20%
Ev-8	Positive	Negative 4	0%

The four events identified having probabilities of 40% or greater, and with moderate to high impacts scores, will be reviewed for consideration in the model development strategic plan (Ev-1, Ev-2, Ev-4, and Ev-5).

5.   **Cross Impact Analysis**

The identified trends and events were analyzed using a cross impact analysis. Each single event was viewed as a potential effect on the individual trend, which would then influence the research question. The impact on the research was then assigned a value ranging from -5 to +5: minus five assigned as the extreme value for a negative impact, plus five as the extreme positive impact on the research question. Zero represents

no impact. Three individuals were used to complete the cross impact analysis. The group identified four significant impacts, Ev-1, Ev-2, Ev-7, and Ev-8 with the median values represented in Table 15.

Table 15.   Cross Impact Analysis

	Tr-1	Tr-2	Tr-3	Tr-4	Tr-5	Tr-6
Ev-1	+2	+2	+2	+5	+3	+4
Ev-2	-3	-2	+1	+3	0	-2
Ev-3	+2	0	-1	-1	-1	0
Ev-4	-3	-3	+1	+1	0	-1
Ev-5	+2	+3	+1	+1	0	-1
Ev-6	+1	+1	-1	-1	+2	-1
Ev-7	+2	+1	+3	+5	+2	+1
Ev-8	+2	+2	-2	-3	-2	0

Ev-1 Pandemic hits United States.
Ev-2 Sabotage disables Internet.
Ev-3 Artificial intelligence implant available.
Ev-4 Computer virus deletes nationally-shared databases.
Ev-5 Gasoline cost exceeds $20.00 per gallon.
Ev-6 Nationalized Public Safety Agency.
Ev-7 Assassination of the President of the United States by international terrorists.
Ev-8 Worldwide antiwar treaty.

Tr-1 Technological advances throughout the world.
Tr-2 Accessibility to personal electronic communication devices.
Tr-3 Number of U.S. residents with a role in the Homeland Security mission.
Tr-4 Federal funding for Homeland Security.
Tr-5 Universal training and response standards for Emergency Responders.
Tr-6 Flexible work schedules.

a.   Analysis of Ev-1: Pandemic Hits United States

A pandemic occurring within the United Sates had the greatest effect on trends. Although a catastrophic event, a pandemic would have a positive influence on trends that affect Communities of Learning. During the NGT panel discussion, a pandemic resulted in a 60% likelihood of occurring in the next ten years. During the cross impact analysis, the panel considered the need for proper planning and response as critical to successful resolution of a pandemic. The need to train Emergency Responders and the community for such an event would require an augmentation to Homeland

Security funds (Tr-4). Funds would need to be dedicated to multiple programs as well as training. With current training capacity well below demand, efficient methods of training and interaction would be required. This requirement would support establishment of Communities of Learning.

The panel discussed issues surrounding quarantines during a pandemic. A critical need for quarantined individuals is the ability to work and communicate. The panel felt that a pandemic would highlight the need for widespread use of personal communication devices (Tr-2) in conjunction with the ability to work remotely. Based on this discussion, the panel then re-defined flexible work schedules (Tr-6) to include telecommuting for those with this capability. The panel felt that any increased use of technology would have a resultant positive effect on Communities of Learning.

A pandemic would demonstrate the need for Emergency Responders to have standardized training throughout the United States. Media highlights of successful and unsuccessful responses to a pandemic would illustrate disparity throughout the country resulting in a call from Congress to standardize training. The effect on Communities of Learning would be positive in this area.

b.   *Analysis of Ev-2: Sabotage Disables Internet*

The disabling of the Internet through sabotage was seen as both positive and negative by the panel. Any disruption of the Internet would reduce confidence in the ability to conduct personal or professional business electronically. The reduced level of confidence would have a negative effect on Communities of Learning. The panel felt the trends heavily reliant on technology (Tr-1 and Tr-2) would be negatively influenced by this event. The event would likely increase funding to law enforcement agencies assigned to cyber terrorism resulting in a positive effect on Homeland Security funding (Tr-4).

c.   *Analysis of Ev-7: Assassination of the President of the United States by International Terrorists*

The panel determined that the assassination of the President of the United States (Ev-7) would result in an immediate increase in personnel (Tr-3) and funding dedicated to Homeland Security (Tr-4). Any increase in staff would require additional

training. The speed and accessibility potential of Communities of Learning would be utilized to accomplish the necessary training. Increased Homeland Security funding would allow for increased capacity to train and interact through Communities of Learning.

d. Analysis of Ev-8: Worldwide Antiwar Treaty

It should be noted that the NGT panel determined that a worldwide antiwar treaty was not likely to occur within the next 10 years. World peace affected two trends positively and three trends negatively. The technology-related trends (Tr-1 and Tr-2) were measured as moderately improving with a worldwide treaty. The panel discussed increased confidence to do business globally would advance technological capacity and therefore have a positive affect on the research question. From a dissenting perspective, a worldwide treaty would reduce the need for Homeland Security personnel, funding, and collaboration (Tr-3, Tr-4, and Tr-5) and therefore negatively affect the research question. The panel gave a parallel to the downsizing of the military following the end of the Cold War.

6. Summary Cross Impact Analysis

The cross impact analysis identified four events that significantly affected trends. Because of having no probability of occurring in the next ten years, Event 8 will not be considered within the strategic plan. Events 1, 2, and 7 will be reviewed for consideration in the strategic plan for model development (Table 16). The most significantly affected trend by the identified events was Federal Homeland Security funding (Tr-4). In addition to TR-4, particular interest will be placed on trends with cross impact absolute values of three or greater, as highlighted in Table 16.

Table 16.   Summary Cross Impact Analysis

	Tr-1	Tr-2	Tr-3	Tr-4	Tr-5	Tr-6
Ev-1	+2	+2	+2	+5	+3	+4
Ev-2	-3	-2	+1	+3	0	-2
Ev-7	+2	+1	+3	+5	+2	+1

C.   ALTERNATIVE FUTURE SCENARIOS

The Nominal Group Technique was used to identify trends and events likely to affect the future of Communities of Learning. Scenario development using the NGT results was used to explore plausible futures. Three potential outcomes were developed from a basic scenario. The three outcomes create futures that are normative, pessimistic, and optimistic. A normative scenario describes the future that is expected to occur. It assumes there are no changes from currently designed plans. The pessimistic scenario assumes that anticipated events will fall to the lowest level of expectation. The optimistic scenario assumes that levels of expectation exceed plans.

1.   Scenario Background

It is March 6, 2012. A storm has stalled over California resulting in several inches of rain and the premature melting of the abundant Sierra Nevada snow pack. The storm known as a "Pineapple Express" has brought lakes and reservoirs to near capacity, and swollen rivers and creeks above flood stage. The National Weather Service forecasting reports no end for the next five days.

At 2:00 a.m. most of California is sleeping. Most law enforcement and fire agencies have put their personnel on standby and instructed them to be prepared for potential flood duty. The streets are quiet with limited vehicle traffic. A four wheel drive SUV drives down a muddy service road toward a fenced-in area containing backup generators of a northern California reservoir. The three men in the SUV are all dressed in black and each possesses night vision goggles, GPS marking devices, two-way radios, and topographic maps. All three are armed with pistols to ensure escape if necessary.

a.   Normative Scenario

It is 2:30 a.m. when Martha Smith is awakened by her cell phone. Struggling to focus on the blinking LED, she realizes it must be a call from work. Her immediate thought is a widespread power outage. Why else would the night shift control

room supervisor be calling at such a horrible hour? "Martha Smith," she answers. "Ms. Smith, it's John Sprague. We have an unusual circumstance at the dam. Our night security team observed two men dressed in dark clothing taking video of the power plant and spillway." "Did you call the Sheriff's Office?" Martha asks.

Martha Smith is the Chief of Operations for a large private Northern California Utility Company that controls over a dozen reservoirs and ten power plants. One of the reservoirs within the utility's service area is 20 miles upstream from Sacramento. With a spillway capacity of 550,000 CFS and a safe channel capacity of only 110,000 CFS, a failure at the spillway would be catastrophic to Sacramento.

The Sheriff's Department dispatcher logs the call for future dispatch. Most of the deputies assigned to the shift were sent home to rest in anticipation of flooding in the days to follow. The dispatcher does an all units broadcast and leaves a note to remind the day shift dispatcher to do the same. The day shift dispatcher is briefed on the events of the previous night and calls a friend she met while attending a class five years earlier. The class sponsored by the Sacramento Regional Office of Homeland Security covered critical infrastructure protection. The detective she contacts puts out an information bulletin to Sacramento area law enforcement.

On March 9, 2012 at 12:30 a.m., a Sacramento area CHP patrol unit attempts to stop a suspicious vehicle circling state buildings. The van had stopped in front of the SBC building then fled as the officers approached. The subsequent pursuit goes on for about two miles when suddenly the van explodes on Highway 160 near Interstate 80. The CHP officers are uninjured, however, the van is destroyed, and the occupants are killed.

At 1:00 a.m., six simultaneous explosions occur across Northern California. Five of the explosions occur at facilities operated by Martha Smith. The explosions destroy all backup generator power at three critical flood control dams. At two of the lakes, several flood control gates are destroyed and water is flowing out of control. All three dams have experienced complete power failure with a loss of supplied power and total destruction of backup generators.

The sixth explosion occurs in a light industrial and mixed residential area of Sacramento. The explosion occurs at the electric power control center for Northern California. The utility company responsible for the control center had no computer backup capability, and the loss of the facility completely shut down power across the western United States.

As reports of the explosions and pending floodwaters reach the Sacramento Police 911 Center, the dispatch supervisor receives approval to launch Reverse 911. Reverse 911 is a telephone notification system capable of reaching thousands of phones per hour. The system notifies area residents to evacuate their homes immediately in anticipation of certain flooding. Even without power, the phone system is still operational for those with hard-line phones. Reverse 911 is also capable of notifying cell phone users through a hard-line interface to cell towers. The Reverse 911 system is credited with saving about 5,000 residents through early notification to evacuate.

The attacks at the dams allow water to flow unchecked down the Sacramento and American Rivers for two weeks before replacement generators and gate stocks were installed. The storm continued to pound the area as runoff from snowmelt and rain caused rivers and creeks to overflow banks. The government center for California sat under 15 feet of water, shutting down state and local government. The sixth largest economy in the world was brought to a stand still without power. It is estimated that 5,000 people died as the floodwaters submerged homes under 10-15 feet of water within hours. Most victims were unaware of the events of the early morning hours until they were awakened as water entered their homes.

b. *Pessimistic Scenario*

It is 2:30 a.m. when Martha Smith is awakened by her cell phone. Struggling to focus on the blinking LED, she realizes it must be a call from work. Her immediate thought is a wide spread power outage. Why else would the night shift control room supervisor be calling at such a horrible hour? "Martha Smith," she answers. "Ms. Smith, it's John Sprague. We have an unusual circumstance at the dam. Our night security team observed two men dressed in dark clothing taking video of the power plant and spillway." "Did you call the Sheriff's Office?" Martha asks.

Martha Smith is the Chief of Operations for a large private Northern California Utility Company that controls over a dozen reservoirs and ten power plants. One of the reservoirs within the utility's service area is 20 miles upstream from Sacramento. With a spillway capacity of 550,000 CFS and a safe channel capacity of only 110,000 CFS, a failure at the spillway would be catastrophic to Sacramento.

The Sheriff's Department dispatcher logs the call for future dispatch. Most of the deputies assigned to the shift were sent home to rest in anticipation of flooding in the days to follow. The dispatcher does an all units broadcast and leaves a note to remind the day shift dispatcher to do the same.

On March 9, 2012 at 1:00 a.m., seven simultaneous explosions occur across Northern California. Five of the explosions occur at facilities operated by Martha Smith. The explosions destroy all backup generator power at three critical flood control dams. At two of the dams, several flood control gates are destroyed and water is flowing out of control. All three dams have experienced complete power failure with a loss of supplied power and total destruction of backup generators.

The sixth explosion occurs in a light industrial and mixed residential area of Sacramento. The explosion occurs at the electric power control center for Northern California. The utility company responsible for the control center had no computer backup capability, and the loss of the facility completely shut down power across the western United States.

The seventh explosion occurred at a telecom hotel located in Sacramento. The attack shuts down hard-line telephone communications in the region including all the 911 centers. The destruction severs one of the two most critical nationwide telecommunication backbone links. The attack disables all hard-line communications between emergency personnel, and eliminates the region's capabilities of utilizing Reverse 911 to notify residents of the evacuation order.

The attacks allow water to flow unchecked down the Sacramento and American Rivers for two weeks before replacement generators and gate stocks could be installed. The storm continued to pound the area as runoff from snowmelt and rain

caused rivers and creeks to overflow banks. The government center for California sat under 15 feet of water, shutting down state and local government. The sixth largest economy in the world was brought to a stand still without power and communication. It is estimated that 10,000 people died as the floodwaters submerged homes under 10-15 feet of water within hours. Most victims were unaware of the events of the early morning hours until they were awakened as water entered their homes. The economic loss extends beyond Sacramento affecting not just California and the United States, but countries that have economic relationships with California. The losses worldwide are estimated to approach $100 billion.

c.   Optimistic Scenario

It is 2:30 a.m. when Martha Smith is awakened by her cell phone. Struggling to focus on the blinking LED, she realizes it must be work calling. Her immediate thought is a wide spread power outage. Why else would the night shift control room supervisor be calling at such a horrible hour? "Martha Smith," she answers. "Ms. Smith, it's John Sprague. We have an unusual circumstance at the dam. Our night security team observed two men dressed in dark clothing taking video of the power plant and spillway." "Did you call the Sheriff's Office?" Martha asks. "Yes mam, and they are notifying Deputy Heck." Sprague continues, "I will send the surveillance video to your email. Do you want me to send it to Deputy Heck as well?" Martha responds while clearing her voice, "Please do, I'll also call him and make sure one of us gets in touch with the Regional Terrorism Threat Assessment Center (RTTAC). John, make sure we contact the regional power authority and request that we place all power companies on alert. Let them know the RTTAC should have information out to all the TLO & ILOs within the next couple of hours. And John, make sure you send the video through the secured training web site. I want to make it easy for the community members to view what we have."

Martha Smith is the Chief of Operations for a large private Northern California Utility Company that controls over a dozen reservoirs and ten power plants. One of the reservoirs within the utility's service area is 20 miles upstream from

Sacramento. With a spillway capacity of 550,000 CFS and a safe channel capacity of only 110,000 CFS, a failure at the spillway would be catastrophic to Sacramento.

Martha Smith calls Deputy Paul Heck and the two go through their procedural checklists. Martha is an Infrastructure Liaison Officer, and Deputy Heck is a Terrorism Liaison Officer. Both have been trained for their roles and interacted for years with others in a community of practice known as the Eastern District Terrorism Information Community. Through a secured VPN hosted by the Sacramento Regional Office of Homeland Security, the community members train, share information/intelligence, problem solve issues, and design the future of the community. The information that is shared within the community is analyzed and distributed to the other California RTTAC's and the State Fusion Center. The State center is responsible for distributing information to partner centers in other states and the federal government.

At 8:30 a.m. during a scheduled "daily knowledge vitamin" interactive training session, investigators from the four California RTTAC's and JTTF's discuss the video that was taken just hours earlier. [32] A couple of the investigators mention that they may have related information from an investigation in the Central Valley. The online community members agree that each will assign a member to monitor the site 24 hours a day until further notice.

During the next two days, investigators and analysts from the four California RTTAC's develop information that leads them to four homes in Yuba County. On March 8, 2012 at 6:00 a.m., investigators assisted by JTTF agents and local SWAT teams, serve search warrants at the four homes and two businesses. During the search investigators discover hundreds of pounds of explosives, eight vehicles including four vans and two SUV's, night vision equipment, sophisticated electronic mapping and diagramming software, and communication devices. Maps, diagrams, and pictures

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[32] Stanley B. Supinski, "The Daily Knowledge 'Vitamin': A Development Guide," *Institute for Information Technology Applications Research Publication 7 Education Series* (January 2003): 5. The daily knowledge vitamin is a daily lesson designed specifically to maintain previously learned knowledge or incrementally increase knowledge.

indicate the suspects had planned to bomb several dams in Northern California, the power control center in Sacramento, and a telecom hotel near the State Capitol.

On March 8, 2006 at noon, just six hours after the search warrants were served in Northern California, investigators from Ohio and New Jersey are logged on to the web-based Homeland Security Community of Learning. Sacramento RTTAC staff have updated investigative notes and findings so online community members could have immediate access. The investigators from Ohio and New Jersey start discussing observed similarities in evidentiary discoveries in Northern California and incidents in both of their jurisdictions. The two agree to coordinate activities, as the next terrorist activities are uncovered.

D.   CONCLUSION

Several trends and events identified during the NGT require consideration in the development of a strategic plan and implementation framework. The panel identified reductions in Federal Homeland Security training funds as important to the development of interactive Internet training. Also discussed was the opportunity to collaborate with the Community College District to create training revenue through accredited courses. The accreditation of courses would be an additional incentive for Community of Learning participation from those who desire college credit. Within the strategic plan and implementation framework, community college representatives must be included as critical stakeholders. Early support in the process is critical to implementation success.

Additionally, the ability to train and share experiences through a Community of Learning creates flexibility in the training process while reducing costs to participant organizations. The panel discussed the scheduling problems and costs associated with sending staff to out-of-area training. The strategic plan must include an analysis of the need for flexibility and identify potential cost savings.

Compounding the financial and flexibility concerns is the projected increase in the number of individuals involved in the Homeland Security process. The increase creates additional demand on an overwhelmed training system. As more people become

involved, the requirement for consistency in information collection, training, and technology increases. All of these factors need to be included in the strategic plan and implementation framework.

The futures study of Homeland Security Communities of Learning is not to predict the future, but rather to project a number of possible scenarios for strategic planning consideration. Defining the future differs from analyzing the past because the future has not yet happened. In this research, useful alternatives have been formulated systematically so that the strategic plan and implementation framework can include a range of possible future environments.

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IV. STRATEGIC PLAN — SROHS COMMUNITIES OF LEARNING

This thesis has identified a void in Homeland Security training that Communities of Learning can fill. The purpose of this chapter is to develop a strategic plan for a Community of Learning within the Sacramento Regional Office of Homeland Security. The strategic plan will specify a goal, identify stakeholders, conduct an organizational capacity analysis, and identify strategic issues.

A. WHY PLAN?

A strategic plan is a long-term, future-oriented process of assessment, goal setting, and strategy building. It is a structured approach, sometimes rational and sometimes not, of bringing anticipated futures to bear on today's decisions.[33] A strategic plan allows an organization to pre-position itself based upon potential future outcomes and helps to establish a vision of the organization in the future while providing clarity of direction. It is not purely analytical in nature but a process balancing quantitative and qualitative, objective and subjective, with room for creativity. "A strategically managed organization is one that both defines where it wants to be and manages change through an action agenda to achieve that future."[34]

A strategic plan combined with an implementation process helps organizations meet their mandates, fulfill missions, and create public value.[35] It is critical in the planning and implementation phase of Homeland Security Communities of Learning that added public value be a consistent theme. The strategic planning process, provided in this chapter, will include organizing the process, analyzing the environment, and identifying and analyzing strategic issues. The implementation plan, Chapter V, will include developing strategies, actions plans, and implementation strategies.

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[33] Tom Esensten, Lecture, California Peace Officer Standards and Training, Command College Class 33, March 2001.

[34] John M. Bryson and Farnum K. Alston, *Creating and Implementing Your Strategic Plan: A Workbook for Nonprofit Organizations*, 2nd ed. (San Francisco: Jossey-Bass 2005), 3.

[35] Ibid., 15.

The strategic plan for this research was designed after review of the literature, analysis of Networked Based Learning, and futures forecasting in the NGT. It defines strategies to develop, implement, and manage efforts to create Homeland Security Communities of Learning. The design will include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. To implement the plan it will be necessary to incorporate findings from the NBL analysis and work through issues identified during the Nominal Group Technique process (Chapter III). The more sensitive issues should be addressed fairly and appropriately to generate support from stakeholders. Interested parties can be grouped into two general categories, stakeholders, and snail darters.

A stakeholder is an individual, group or organization who may be affected by the process or outcome of the strategies designed in the strategic plan. During the planning process, it is imperative that stakeholders are identified and that they become involved in the development. To leave out a stakeholder in the interest of time, priority, convenience or ignorance may result in a stakeholder becoming a snail darter.

Snail darters are individuals, groups, or organizations that often go unidentified during the initial strategic planning process. Because they go unidentified, their input is often excluded, overlooked, or ignored. The effect of snail darters on transition management, when they do eventually become involved, can be detrimental to the process.[36]

B.   THE PLAN

The scenarios illustrated in Chapter III identify three potential outcomes to a terrorist event. The characters in the optimistic scenario use collaborative technologies designed thorough a Community of Learning to thwart a terrorist attack. The optimistic scenario illustrates the communication and networking potential of Communities of

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[36] The tiny Snail Darter is one of the most famous fish in North America. It became the focus of attention in 1977 when its status as an endangered species delayed construction of Tellico Dam in the Tennessee Valley. Dam opponents used the snail darter in litigation attempting to stop the dam. The case worked its way up to the Supreme Court who decided in favor of the snail darter. The dam was ultimately built. For planning purpose, "snail darter" is a reference to how unforeseen or ignored stakeholders can seriously disrupt plans.

Learning. Using the optimistic scenario as the vision for the future, the strategic planning process is separated into four areas: (1) identifying the specific strategic goal; (2) stakeholder and snail darter identification; (3) organizational capacity analysis; and (4) strategic issue identification.

1.   Specific Strategic Goal

The strategic goal of this research is to create Homeland Security Communities of Learning designed to include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. To accomplish this, e-learning and communities of practice technologies are combined.

A Community of Learning for Homeland Security will be created, organized, and structured within the Sacramento Regional Office of Homeland Security (SROHS). The SROHS has collaborated with the Northern California Public Safety Training College (NCPSTC) for Homeland Security training of Emergency Responders from the Sacramento region. The NCPSTC membership includes local and state fire agencies, local law enforcement, and the Los Rios Community College District. The Board of Directors of the Training College include leadership from SROHS member agencies, which allows for improved coordination, consistency in training policies, and the ability to leverage government policies and resources.

2.   Stakeholders and Snail Darters

A stakeholder analysis is a method of identifying who are the organization's internal and external stakeholders, how important they are, how they influence the organization, and what the organization requires from them.[37] If the planning effort is to be successful and strategies implemented, it is critical to build support from people and organizations that the change will affect. By viewing stakeholders as potential strategic allies or partners, the chances for success improve.

A stakeholder analysis identified and separated individuals, groups, and organizations into two categories: internal and external (Table 17). "An internal

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[37] Bryson and Alston, *Creating and Implementing Your Strategic Plan*, 53.

stakeholder is any person, group, or organization inside the organization that can make a claim on the organization's attention, resources, or output or that is affected by the organization's output."[38]   Internal stakeholders are those from agencies with direct influence of, or are affected by, the Sacramento Regional Office of Homeland Security or the Northern California Public Safety Training College. An external stakeholder is any person, group, or organization outside the SROHS or NCPSTC that can make a claim on attention, resources, output, or that is affected by either organization.[39]

Table 17.   Stakeholder List

Internal	External
Sacramento Police Dept	FBI
Sacramento Sheriff's Dept	US Attorney Eastern District of California
Sacramento Metro Fire	California Office Homeland Security
Sacramento City Fire	Roseville Fire Dept
Sacramento Co. Health Dept	Roseville Police Dept
Los Rios Community College Dist	Rocklin Fire Dept
Sacramento Police Officers Assoc.	Rocklin Police Dept
Sacramento Deputy Sheriff's Assoc.	West Sacramento Police Dept
Fire Local 522	West Sacramento Fire Dept
City of Sacramento	Sacramento Region non-Emergency
County of Sacramento	Responder public and private
McClellan Park Corp.	N. California Emergency Responders

Internal stakeholders were placed into a power versus interest grid (Table 18). The power versus interest grid helps identify those whose interests and power bases must be taken into account in order to address Communities of Learning.[40] The grid assists in development of political strategies based upon where the power brokers are located and how political climates affect those who have low power but can influence those with power. For example, in the power grid, labor unions possess high interest but low power.

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[38] Bryson and Alston, *Creating and Implementing Your Strategic Plan*, 61.

[39] Ibid., 59.

[40] John M. Bryson, *Strategic Planning for the Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement*, 3rd ed. (San Francisco: Jossey-Bass, 2004), 338.

Their relationship with elected and appointed leaders in city and county government, who possess high power, may allow the unions to have high power influence.

Table 18.   Power vs. Interest Grid

	Low Power	High Power
High Interest	Sacramento Co. Public Health Sacramento Metro Fire Sacramento City Fire Los Rios Community College Dist Sacramento Police Officers Assoc Sacramento Deputy Sheriff's Assoc Fire Local 522	Sacramento Police Dept. (SPD) Sacramento Sheriff's Dept. (SSD)
Low Interest	McClellan Park Corp.	City of Sacramento County of Sacramento

The power versus interest grid revealed that the power resides within the Sacramento Police Department and Sacramento Sheriff's Department, the two agencies that control the UASI funding. Combined, both agencies represent half of the NCPSTC Governing Board (Figure 6). When all high interest parties are included, the primary members of the SROHS and NCPSTC are represented. This relationship creates opportunities for timely application of initiatives.

Figure 6.   NCPSTC Governing Board

Sacramento Police Department
Sacramento Sheriff's Department
Sacramento Regional Fire Joint Powers Authority
Los Rios Community College District

If stakeholder involvement is poorly handled a potential snail darter emerges with labor union resistance. Whenever working conditions appear to change for union members, union leaders demand input. This is particularly true when changes affect income or work schedules. The use of e-learning has potential for significant cost savings. The most significant savings involves labor costs. Instructors and students from some public sector disciplines depend on secondary employment income and overtime.

They receive this income from participation in training courses as either students or instructors. Communities of Learning have the potential to reduce physical presence at training, allowing for flexible training periods, and therefore reducing the need for overtime resulting in reduced income for employees.

3. Organizational Capacity Analysis

Organizational capacity analysis is an objective inventory and assessment of the organization's strategic strengths and weaknesses. Effective organizations take advantage of strengths and opportunities while at the same time reducing weakness and overcoming challenges. This research utilized the SWOC model to analyze **S**trengths and **W**eaknesses and view them according to environmental **O**pportunities and **C**hallenges (Table 19). The SWOC analysis looks at the environment from two primary dimensions, good (strengths and opportunities) and bad (weaknesses and challenges), as well as two temporal dimensions, present (strengths and weaknesses) and future (opportunities and challenges). The tool examines organizational function as it relates to specific tasks performed.[41]

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[41] Bryson, *Strategic Planning*, 125–129.

<p align="center">Table 19.   SWOC Analysis</p>

Strengths	Weaknesses
Problem Solving Structure	Law Enforcement attitude
Technology driven	Lack support @ executive level
Community support	Lack support from DHS
Regional Cooperation	Limited in-house expertise
NCPSTC Training JPA	Budget limitations
Support from State of Ca.	Lack of integration in day-to-day
Inter Dept Budgeting @ JPA	No clear role
Opportunities	**Challenges**
Collaboration with public agencies	Reduced HLS funding
Collaboration with private	Competing interests for money
Integrate training	Reputation
Improved regional cooperation	Politics
Leverage multi-hazard	Liberal City Council vs. Rep. Admin
Educational partnerships	So. Cal attention
Partnership with So. Cal.	ACLU
Inter Gov't Budgeting	Politically liberal elected body
In-house training	Governmental Budget Cycles
	JPA approval requirements

An analysis of strengths illustrates trends in two general areas. The first is technology. Some of the member agencies with the SROHS have invested in technology as a general business practice. The Sacramento Police Department has demonstrated a commitment to utilizing technology in all areas of the organization including training. As the managing agency for Urban Area Security Initiative (UASI) funding, the department has acquired hardware and software to facilitate Communities of Learning. The second identified strength is the cooperation of the regional agencies. The partnerships established through the training college prior to September 11, 2001 and the establishment of the SROHS in 2003, have positioned the region well for stakeholder support for implementation of Communities of Learning.

Weaknesses are centered on a lack of priority given to Homeland Security issues. Many leaders in the community believe that terrorist activities are limited to larger cities and a level of complacency has developed in the region. Without a direct link between Homeland Security efforts and the day-to-day operations of the agencies, a lack of

support will exist. Adding to the weakness is partisan politics at the federal, state, and local levels that have limited the ability to garner local support in the area of Homeland Security.

The Opportunities portion of the SWOC identified increased collaboration with government agencies that are not participants in the SROHS. Collaboration opportunities with schools, utility companies, public housing agencies, convention and visitors bureaus, and chambers of commerce can create opportunities that have been previously untapped. The same is true in the private sector. While attention has been placed on the protection of critical infrastructure and the importance of the community in anti-terrorist activities, there has been little support for training of non-Emergency Responders.

Within the SROHS, the opportunity exists to incorporate daily operations and training into the Community of Learning model. The regional partnerships and experience with combining students from multiple agencies into the same training courses demonstrates an acceptance of regionally based training. This integration improves communication and has potential for reduced costs.

The challenges appear to center around two overarching themes, funding and politics. As background, the primary funding source for the SROHS is the UASI program. A pending decision by DHS may result in the elimination of Sacramento UASI funding in 2007. Without UASI funds the challenge for the SROHS is to diversify funding while creating a revenue stream to maintain adequate funding levels. Political support at the federal, state, and local level is vital to the successful implementation of Communities of Learning. Critical for support is the continuous engagement of key stakeholders.

4. Strategic Issues

Strategic issues are fundamental policy questions or challenges affecting the vision, mission, and values of an organization. "Identifying strategic issues is the heart of

the strategic planning process."[42]   The SWOC, stakeholder analysis, NBL assessment, and NGT identified three strategic issues.

1. How will the Sacramento Regional Office of Homeland Security (SROHS) best use technology to create Homeland Security Communities of Learning? One of the identified strengths in the SWOC was technology. It will be critical to use technology wisely to overcome weaknesses such as clear role, budget, reputation, politics, and competing interests identified in the challenges area of the SWOC.

2. How will the SROHS create a diversified funding stream? A critical weakness and challenge is funding. The status quo requires the use of grant funds. Using the strengths of the NCPSTC and opportunities with educational partners, a revenue stream outside of grant funds is possible.

3. How will SROHS expand Communities of Learning beyond the region? The Sacramento Police Department is currently designing a Community of Learning within the organization that will expand to include the Sacramento Fire Department. The model has the ability for continued expansion beyond the city with the correct formula of political will, budget considerations, partnerships, and marketing.

The three strategic issues set the stage and provide focus for a Community of Learning implementation plan.

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[42] Bryson, *Strategic Planning*, 42, 153.

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V. COMMUNITY OF LEARNING IMPLEMENTATION STRATEGY

Thus far, this research has identified and narrowed the focus through a review of the literature. An assessment of current conditions included an analysis of Networked Based Learning used by CHDS and an interview with an expert in Homeland Security training delivery. A look into potential future issues related to Communities of Learning was conducted through the NGT process. All of these were brought together in the development of a strategic plan for Communities of Learning. To bring the research to conclusion this chapter will present an implementation strategy and offer a pilot program to get Homeland Security Communities of Learning off the ground.

The partner document of a strategic plan is an accompanying implementation plan and process. The implementation plan must consider the capacity to move the developed strategies forward. The proposed conceptual model will address collaboration and continuing education shortfalls as learners move away from interactive traditional classroom learning to more static web-based methods. The model will create a shared place on the Internet that addresses Homeland Security learning needs through shared networks and technology allowing members from multidisciplines to work as a community to learn, share information, problem solve, and create innovations.

The Community of Learning implementation plan identifies technology requirements, curriculum development, administration, and support. The model will serve as concept development for use in Terrorism Early Warning (TEW) participant training.

The strategy, while limited to Terrorism Liaison Officer and Infrastructure Liaison Officer Communities of Learning, demonstrates the broader ability to create Communities of Learning at a significantly reduced cost while enhancing capabilities and innovation. The plan also illustrates the ease and cost effectiveness of including non-emergency response personnel in Homeland Security training.

The proposed implementation involves a staged process that includes a pilot. The first stage of the process will be to introduce a Community of Learning within an agency that has sufficient technological infrastructure to support full implementation. Additionally, stakeholders within the selected agency must be active supporters of the pilot. The diversity of stakeholders and the challenges identified in Chapter IV create a few technical and political difficulties requiring attention. The best way to identify and overcome these problems is through a pilot followed by a strategic staged approach.[43]

A review of the SWOC Analysis (Table 19), Stakeholder List (Table 17), and Power vs. Interest Grid (Table 18) identified the Sacramento Police Department (SPD) and Sacramento Sheriff's Department (SSD) as agencies with the greatest interest and the greatest power. Additionally, SPD and SSD participate in all policy decisions for SROHS, RTTAC, and NCPSTC. Therefore, both agencies are potential candidates to serve as a pilot. The Sacramento Police Department was selected based on availability of funding, technological infrastructure, and stakeholder support.

A.   PERFORMANCE MEASURES

Critical to the success of Communities of Learning is the ability to document and measure the desired end results. Harty, defines end outcomes as "events, occurrences, or changes in conditions, behavior, or attitudes that indicate progress toward achievement of the mission and objectives of the program." A distinction exists between intermediate outcomes and desired results.[44] Intermediate outcomes are measurable and lead to the desired result but are not the ultimate end. An example is seen in a measured improvement in skills of an employee who recently completed training. The intermediate outcome is the improvement in skills. However, the desired result is the affect the improved skills have on organizational capabilities.

Too often success or failure is determined by outputs without consideration of outcomes. Additionally these outputs are reported as stand-alone measures without

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[43] Bryson, *Strategic Planning*, 258–259.

[44] Harry P. Harty, *Quicker, Better, Cheaper? Managing Performance in American Government,* ed. Dall Forsythe (Albany: Rockefeller Institute Press, 2001), 17–25.

comparison to performance benchmarks. Performance measures for Communities of Learning will be determined by outcomes and evaluated against appropriate benchmarks.

1. Inputs, Outputs, Outcomes

To compare outcomes of current e-learning programs with potential outcomes of Communities of Learning, a logic model was constructed for each (Tables 20 & 21). The logic model provides a useful way to illustrate and identify inputs and activities that may be influenced between the two methods as well as areas for performance benchmarking.

Table 20. E-learning Using Asynchronous Methods

INPUTS	OUTPUTS	INTERMEDIATE OUTCOMES	END OUTCOMES
• Money • Staff • Volunteers • Facilities • Hardware & Software • Interconnectivity	• Classes Offered • Students • Materials distributed • Log in hits numbers and hours	• Knowledge (pre vs. post test) • Increased skill • Cost to student contact hours • Voluntary continued participation	• Increased organizational capabilities

Table 21. Communities of Learning

INPUTS	OUTPUTS	INTERMEDIATE OUTCOMES	END OUTCOMES
• Money • Staff • Volunteers • Facilities • Hardware & Software • Interconnectivity	• Classes Offered • Students • Materials distributed • Log in hits numbers and hours	• Knowledge (pre vs. post test) • Increased skill • Cost to student contact hours • Voluntary continued participation • Interaction with Peers • Interaction with Instructors	• Increased organizational capabilities • Continued interaction with peers • Continuing education

Output measures for both alternatives require simple tracking and comparison of money, people, course offerings, and course completion. An output difference between methods is interaction between students, students and instructors, and instructors. Static e-learning does not facilitate interaction between students and most Homeland Security

Programs; interaction between instructors and students is not readily available.[45]   In a Community of Learning environment, interaction is encouraged and in most cases required. While interaction is simple to measure in outputs, it becomes an important distinction in outcomes. Too often, the success of e-learning is measured in outputs. The number of Emergency Responders completing the NIMS awareness course, for example, is considered a success if the numbers are high. The outcome of increased skill or increased organizational capacity is not directly measured. Conclusions are simply drawn from output data.

Reliable outcome measures for both methods require objective and subjective measures. Traditional efficiency and productivity measures such as cost per student contact hour, test results per contact hour, participation levels, etc., are simple to determine and calculate. Objective measures such as the hypothesis that continued interaction with peers leads to continued informal learning, and informal learning improves performance, are not easy to measure. Although difficult to quantify end outcomes, the creation of Homeland Security Communities of Learning has potential to have greater intermediate and end outcomes.

2.   Benchmarking

Benchmarking is a method of evaluating process in relation to best practices. To appropriately benchmark, critical components of Communities of Learning must be identified and evaluated. The strategic goal of the research is to create Homeland Security Communities of Learning designed to include collaborative technologies such that information sharing leads to enhanced capabilities and innovation. To accomplish this, e-learning technologies are combined with communities of practice that create a social structure that develops knowledge and information sharing.

a.   *Subjects to be Benchmarked*

Critical to Communities of Learning is collaboration technology and information sharing. As identified in the NBL assessment, three areas contribute to the success of NBL: logistics, instructor responsiveness, and participant interaction.

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[45] Philip Allum, interview by author, July 3, 2006.

Benchmarks must include evaluations of course website content including information, materials, additional resources, and links provided. Participant activity, including interaction with fellow participants and instructor responses to questions or comments also require measurement. The measurements must be careful to avoid or at least distinguish voluntary participation from compulsory interaction. The distinction is important so that bias is reduced or eliminated

b. *Organizations to Benchmark*

Organizations to be measured will include Homeland Security institutions that offer and support e-learning including the Center for Homeland Defense and Security (CHDS), Federal Emergency Management Administration (FEMA), and Texas A&M University National Emergency Response and Rescue Training Center. These institutions were selected because of their reputations as educational leaders in Homeland Security. All three organizations offer direct delivery, onsite, and Internet-based training programs.

c. *Data Gathering*

Variables reviewed will have a direct relationship to Homeland Security training and include logistics, instructor, and participant variables.

- Student participation including numbers trained via distributed learning methods;

- Student re-enrollment for multiple courses;

- General course elements;

- Course activities;

- Post and pre-test results;

- Distributed learning satisfaction surveys;

- Community of practice participation;

- Costs based on a per student contact hour;

- Post-training interaction.

d. *Data Collection & Analysis*

All of the institutions to be examined are publicly funded and prepare annual reports. Reports will be collected and analyzed by SROHS staff to determine benchmarks as well as benchmark bias. As identified in Chapter II, an example of potential bias is the use of CHDS graduate student satisfaction with NBL. To account for potential bias, great care must be exercised when establishing benchmarks.

Benchmarks will be compared to internal performance to determine areas of success and opportunities for improvement. The analysis combined with futures forecasting will allow the SROHS to continuously evaluate goals. Revisiting and updating the SWOC is included in the evaluation plan. An assessment phase will include reports to all the SROHS governmental bodies with a review of proposed strategies.

B. PLAN IMPLEMENTATION

The ability to implement Communities of Learning is not without significant challenges. The ultimate goal of training tens of thousands of people in various topics related to Homeland Security while simultaneously encouraging continued participation through communities of practice has many hurdles. A pilot project will be the implementation model that will create the momentum necessary to identify and resolve issues and problems.

1. Technology Requirements

Technology requirements must be defined by outcomes, not tasks.[46] The outcome of merging e-learning with community of practice requires emphasis on communication tools and ease of manipulation, both within a secured environment capable of real time interaction. The technology must be able to support instructional content within three general areas: Static content including documents, images, web pages, audio and video; interactive content to include calendars, animations, quizzes, wiki, etc.; and social interaction that includes discussion boards, chat areas, email service, instant messaging, conferences (voice and video).

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[46] Michael Hammer, "Reengineering Work: Don't Automate, Obliterate," *Harvard Business Review*, 68 (July–August 1990): 108.

The specific hardware and software specifications of an e-learning solution are outside the scope of this research. However, information is provided so that the general extent of the solution is understood.

Hardware needs include both database and application servers. The servers will be used to store and retrieve Community of Learning information. Interaction with remote clients must have access control and intrusion detection. Security of information databases was identified as a concern during the NGT. Therefore, encryption, authentication, and message integrity must be priorities.

Several course management software packages exist, including Moodle, eCollege, ANGEL, Desire2Learn, IntraLearn, Sakai, and Blackboard. However, the selection of software is beyond the scope of this research and is offered to show availability.

2.   Learning Curriculum Development

Subject matter experts who are also familiar with adult learning principles will develop all courses. The principles of Instructional System Design (ISD)[47] will be utilized to include: conducting learning needs analysis; identifying learner characteristics; developing course goals, objectives, topics, tasks, outlines, lesson plans, budgets, visual aids and learning activities; developing pre and post-tests to assess individual student's knowledge, and proper evaluation tools.

The plan calls for designing an e-learning course for Terrorism Early Warning Group (TEW) members to improve their ability to access, exploit, analyze, and produce intelligence products at all phases of operations. E-learning familiarization and use will be a structured domain of the course.

The plan also requires the design of an e-learning course for Terrorism Liaison Officers (TLO) to develop skills and provide them with training materials, which will allow them to function as TLOs in their local region.

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[47] ICF Consulting, "Instructional Systems Design," (2005),
http://www.icfconsulting.com/Services/Training/trng-isd.asp (accessed September 10, 2005).

Lastly, the curriculum development requires an e-learning course for Infrastructure Liaison Officers (ILO) to ensure their understanding of the ILO's role in the terrorism/WMD information and intelligence chain, and provide them with materials that will allow them to participate throughout the United States with other members of the community.

3.   Community of Practice – Collaboration Method

Communities of practice will be designed and implemented starting with current SROHS and RTTAC participants. Once the collaboration technologies have been tested, the community will be expanded to including the STTAC and remaining California RTTAC's. Individual RTTAC's will be assisted in implementation of TLO and ILO regional sub-communities.

Training TLO and ILO members using Communities of Learning will help them become active members of regional sub-communities. Each California RTTAC will be responsible for defining geographic boundaries.

4.   Performance Measures

Community of Learning participants will take a short pre-test to demonstrate their level of knowledge prior to training. At the end of their training session, students will complete a post-test for comparison purposes. Pre-test may include baseline Internet skills evaluation.

In addition to student pre and post-tests, each student will describe their opinions and feelings about the usefulness of Communities of Learning. General course elements and activities to be evaluated include instructor involvement, content and structure of the website, and interaction between participants. The variables identified in the NBL

analysis (Chapter II) will serve as the initial benchmark. Periodic follow-up surveys will be designed and administered to measure satisfaction, participation, and knowledge retention.

5. Financial Analysis

Critical to the implementation of Communities of Learning is an analysis of costs and a comparison to current methods of training delivery. The goal of G&T is to increase the numbers of Emergency Responders trained while containing expenses. Central to the concept of Communities of Learning is the ability to train greater numbers of people at reduced costs. Additionally the NGT panel identified the need to increase training capacity while controlling costs at a time of financial uncertainty.

Fortunately, a comparison can be made between costs associated with traditional instruction and costs projected for Communities of Learning. In 2005, the SROHS submitted a proposal to G&T for direct lecture-based training of TLO and ILO using traditional classroom training methods. The student population included 7,375 individuals from throughout California attending courses in Los Angeles or Sacramento. A comparison of costs associated with traditional teaching methods and e-learning for TLO and ILO programs was completed as part of this research.

a. Traditional Instruction

The costs for direct classroom instruction are summarized in Table 22. Included in the budget are 12 full time staff, travel and per diem for students, training aids, equipment, supplies, consultants for curriculum development and multi-media creation, and classroom instructor time. The $15.8 million is for a two-year cycle.

Table 22.   Traditional Instruction

BUDGET CATEGORY	AMOUNT
Personnel	$2,746,910
Travel	9,841,025
Equipment	514,620
Supplies	448,254
Consultants/Instructors	2,278,036
TOTAL COSTS	**$15,828,845**

b.   *Community of Learning*

An estimate (Table 23) was prepared for a Community of Learning for the same courses listed above. Areas of greatest potential savings include personnel, travel, and instructors. With the use of interactive Internet-based training as the primary instructional delivery method, the potential California student population far exceeds the 7,375 proposed in the traditional instruction grant proposal. The ability for students outside of California to enroll also increases the potential population. While the ability to use Communities of Learning is not limitless, the number of potential students completing the TLO and ILO courses could be in the tens of thousands. The costs for the proposed Community of Learning were calculated using the following assumptions for a similar two-year period:

- E-students will provide their own Internet access and equipment;

- Centralized staff to include one E-director and two support staff;

- Travel is limited to subject matter experts assigned to Homeland Security;

- No out-of-area student travel is required;

Table 23.   Community of Learning

BUDGET CATEGORY	AMOUNT
Personnel	$934,702
Travel	100,000
Equipment (hardware, software license)	251,030
Supplies	14,500
Consultants	1,200,000
TOTAL PROJECT COSTS	**$2,500,232**

c. *Implementation Cost Analysis*

The cost comparison of classroom instruction to Communities of Learning illustrates a savings of over $13.3 million, an 84% savings. Consideration must be given to the validity of the assumptions for Communities of Learning. However, the magnitude of savings with Communities of Learning is so significant that any variance in assumptions must be extreme to mitigate the significant savings. Additionally, funding limits the number of participants trained in a classroom setting. For each student there is a direct cost associated with instructors, travel, and per diem. In the Community of Learning, participant enrollment is not limited by travel and instructor costs, but by hardware and software restrictions.

The true benefit may not be strictly financial. Participant involvement and learning objective measures must be taken into consideration. A direct curriculum benefit analysis will be conducted using pre and post curriculum scoring and program costs per student and contact hours. A comparison will be made to current Homeland Security Centers of Excellence that utilize direct delivery training methods. Direct delivery will be analyzed by instructor travel, participant travel, and courses requiring physical manipulation skills.

Community of Learning information flow will be tracked as to source including TLO and ILO trained participants. The goal is to track community of practice outcomes and measure social interaction of participants.

C. COMMUNITY OF LEARNING PILOT

For the purpose of this research, a pilot is proposed to measure the impact of a Community of Learning in a small, semi-controlled environment. The pilot will attempt to generate a sense of strategic urgency while creating a cultural change in an organization that has the technical expertise to adapt and adjust to a Community of Learning.

An e-learning software package with collaboration capabilities will be implemented within the Sacramento Police Department (SPD). The police department was selected because of the high reliance on and acceptance of technology. The department uses hardware and software applications for most day-to-day operations

including report writing, mapping, online crime tracking, and communication. There are more personal computers in the department than personnel with each police officer issued a personal computer in addition to computers installed in vehicles. Additionally, hardware and software technical support capability is a priority with executive leadership. Recent hiring of large numbers of officers has resulted in an influx of personnel comfortable with and supportive of interactive Internet training.

The pilot within SPD will initially be structured around Homeland Security education courses and information unique to the agency. The department will use the Community of Learning to educate as well as prepare employees for transfer opportunities, promotions, provide access to department policies and procedures, provide a site for information exchange and discussion. By using the tool for education, professional growth, and organizational communication, acceptance by stakeholders is demonstrated and eventually expansion to regional partners is enhanced. Included in the pilot will be volunteers who are not Emergency Responders. By including volunteers, the pilot will be able to measure the ability to reach outside of the organization into community service volunteer groups.

1. **Pilot Outline**

- The Sacramento Police Department Information technology staff will be responsible for hardware and software installation and maintenance. The department will leverage the existing knowledge of employees familiar with interactive Internet technology.

- The department will continue the partnership with the Center for Homeland Defense and Security. The partnership was formed to develop a Community of Learning within the Police Department. Benefits to both organizations include technical development and support.

- Funding for Homeland Security Communities of Learning will be through Urban Area Security Initiative grant funds. The UASI Policy Board supports the use of UASI Funds. The board members include representatives from public health, fire, EMS, and law enforcement.

- Department software implementation will include remote access to Homeland Security training material, internal department resource material, internal promotional material, internal transfer testing and training opportunities, in-house events, internal collaboration, and links to external Homeland Security links. During future stages of implementation, tools for collaboration will allow interaction with individuals outside of the organization.

- Weekly staff meetings and InfoCOMM (SPD version of Compstat) will utilize Community of Learning and collaboration software.

- Employees who are reluctant to be involved will participate in focus group activities designed to identify issues and mitigation opportunities.

2. Alternatives

An alternative to creating a Community of Learning with in-house resources is to contract for services with a private vendor. Contracting creates direct benefits of reduced commitment of SPD staff time for hardware and software design, development, and installation. Contracted training has similar benefits and limitations.

Disadvantages of contracting include the potential loss of organizational commitment opportunities through shared project development experiences. Teambuilding research indicates that work team projects improve performance while creating a greater commitment to success.[48] Additionally, limited in-house expertise will increase costs as the model moves from a pilot to full implementation.

3. Pilot Summary

The pilot is designed to leverage organizational strengths to improve probability of success. The department's heavy reliance on technology for day-to-day operation creates a pool of highly proficient employees with personal computer applications. The use of Communities of Learning technology for department-wide applications including transfer and promotional opportunities, department resource material, and department

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[48] Carl E. Larson and Frank M La Fast, "Monitoring the Status of Teams" (paper presented at the Annual Speech Communication Association Convention, San Francisco, California, 1989).

events creates a positive and safe environment for utilization. As a pilot, the Sacramento Police Department has the ability to customize the Community of Learning technology to meet the needs of the organization and ultimately the region.

D.   CONCLUSION

The advantages of a shared place on the Internet that addresses Homeland Security learning needs through shared networks and technology that allows members from multidiscipline's to work as a community to learn, share information, problem solve, and create innovations are many and varied. The opportunity exists to train participants in greater numbers and with expanded frequency. A training-need assessment within California identified that the Emergency Responder student population far exceeds the ability of the G&T approved teaching institutions to provide Emergency Responder training (Table 24).[49]

Table 24.   WMD Training Needs

	Sacramento	California
Awareness	4,864	467,177
Performance Defensive	2,219	260,980
Performance Offensive	163	70,633
Planning/Management	479	47,277

The social aspects of Communities of Learning create opportunities for information sharing and continued growth outside of the original learning process. This communication and growth has potential to lead to additional relationships and partnerships resulting in improved information and intelligence flow.

However, with any redesign of a system, there will be implementation issues. Systems will require testing and redesign by small test groups. Without proper involvement from stakeholders early in the process, overall success is jeopardized. Stakeholder involvement may be difficult to achieve with the private sector. While

[49] Office for Domestic Preparedness, *A comparison using 2003 Office for Domestic Preparedness SHSAS Training Assessment for California.* Calculated from information submitted by operational areas within California. The assessment has restricted online access htpps://www.dct.odp.dhs.gov.

Emergency Responders have a basic understanding of their roles in Homeland Security, private sector involvement has been limited at best. Obtaining private sector inclusion is critical.

Classroom participation results in some level of relationship building that cannot be replicated in an online environment. When classroom attendees represent multiple disciplines, the face-to-face interaction may have greater relationship returns than e-learning.

The greatest potential for failure is the lack of participation. To be successful, Communities of Learning require participation. With any change, there will be some form of resistance. Some participants may feel more comfortable in a classroom environment while others may lack basic computer skills.

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VI.   IMPLICATIONS FOR FUTURE RESEARCH AND STRATEGY DEVELOPMENT

This thesis presents an implementation strategy for Homeland Security Communities of Learning designed from a review of the literature, assessment of Networked Based Learning, futures forecasting through Nominal Group Technique, and the development of a strategic plan. The implementation framework includes a pilot project designed to test the impact of Homeland Security Communities of Learning on information sharing, training costs, and innovation. The pilot also provides an opportunity to expand research in the area of Communities of Learning, particularly within Homeland Security.

As the threat of domestic terrorism increases, so does the need for efficient, effective, and flexible training and collaboration. An increased role for organizations and individuals in Homeland Security creates the need to share information between government organizations, private sector, and community members. The increase in roles also creates additional demand on an overwhelmed training system. As more people become involved, the requirement for consistency in information collection, training, and technology increases.

The findings of this research indicate that Homeland Security Communities of Learning provide the necessary consistency in both training and technology while at the same time creating capacity to improve information sharing and reduce training costs. Innovation, the remaining variable in the research question, is an area that requires additional study.

While findings support the development of Homeland Security Communities of Learning, several limitations must be acknowledged. The first involves the use of NBL results. As reported, the use of graduate level students from Emergency Responder disciplines is not necessarily a representative sample of the larger population. The selection process also creates a bias toward highly educated individuals actively involved in the Homeland Security field. Additionally, online activity as a grade requirement may unintentionally bias participation, a critical component of Communities of Learning.

Any correlations between the success of Networked Based Learning and participation require scrutiny as they relate to the creation of Communities of Learning.

The second concern is the propensity to over-generalize results of research. This study was designed to add to the body of knowledge and assist in determining the impact of Homeland Security Communities of Learning. It was not designed to be a panacea for all Homeland Security training ills. There are courses that require direct delivery and role-play. Participants in these courses should be included in Communities of Learning for the purpose of collaboration and advancing knowledge.

Additional research is required to determine the extent that Communities of Learning lead to enhanced Homeland Security capabilities, collaboration, and innovation. As Federal guidelines standardize training and response, not only across disciplines but also across regions of the country, Homeland Security Communities of Learning have potential to enhance delivery and collaboration.

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